JUN 14 1930

The Physiotherapy Review

Vol. X No. 3

Table of Contents

Page

Two Active Principles of Physiotherapy from the Standpoint of a General Surgeon. *Francis M. Findlay, M. D.* 334

Myofibrositis—Discussion of Its Causes. *Jerome H. Samuel, M. D.* 335

Some Similarities of Birth Injuries to the Brain and to the Spinal Cord. *Randolph K. Byers, M. D.* 339

Physiotherapy and the Clinician. *Harry E. Mock, M. D. F. A. C. S.* 341

Some Principles Used in Electrotherapy. *Charles R. Brooke, M. D.* 344

Thermoluminous Medication and the Ultraviolet Rays. *A. Joseph Riviere, M. D. (Paris), Sc. D.* 348

"The One Who Walks With Grace and Poise." *Dorothea M. Beck* 353

Editorials 356

Abstracts. *John S. Coulter, M. D.* 359

Problems in Physical Therapy Given to Students at Wellesley College 364

Published Bi-Monthly By

THE AMERICAN PHYSIOTHERAPY ASSOCIATION

MAY-JUNE, 1930

Massachusetts, New Jersey and New York Number

Chapter Directory

AMERICAN PHYSIOTHERAPY ASSOCIATION, Cleveland Chapter
President, Miss Helen Kaiser, Mt. Sinai Hospital.
Secretary, Mrs. Margaret Cleveland, Lakeside Hospital.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Chicago Chapter
President, Miss Jessie L. Stevenson, 6225 University Avenue.
Secretary, Miss Jennie Strand, 11335 Stewart Avenue.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Minnesota Chapter
President, Miss Marian Denny, Gillette State Hospital, St. Paul.
Secretary, Miss Helen Foss, 1826 La Salle Ave., Minneapolis.

AMERICAN PHYSIOTHERAPY ASSOCIATION, New York Chapter, Inc.
President, Mrs. J. C. Mahan, 228 Bragaw Street, Long Island City.
Secretary, Miss Elizabeth P. Gillingham, 199 Walnut St., Montclair, N. J.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Northern California Chapter
President, Miss Julia Tuggle, 501 Taylor St., San Francisco.
Secretary, Miss B. S. Ballard, 210 Fitzhugh Building, San Francisco.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Southern California Chapter
President, Miss Lucile R. Grunewald, 1411 Mar Vista Ave., Pasadena.
Secretary, Miss Lilly Valley, 2405 Crenshaw Blvd., Los Angeles.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Oregon Chapter
President, Mrs. Vera Schwartzman, 712 Lincoln St., Portland.
Secretary, Miss Jennie Hunter, 1185 East Stark St., Portland.

AMERICAN PHYSOITHERAPY ASSOCIATION, Rhode Island Chapter
President, Mr. Howard Coughlin, 45 Dartmouth Ave., Providence.
Secretary, Miss Helen L. Babcock, 32 Wesleyan Ave., Providence.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Wisconsin Chapter
President, Miss Mildred Elson, 542 Jackson St., Milwaukee.
Secretary, Miss Florence L. Phenix, 282 Pleasant St., Milwaukee.

DISTRICT OF COLUMBIA PHYSIOTHERAPY ASSOCIATION
President, Miss Elinor Jones, Walter Reed Hospital.
Secretary, Mrs. Frieda Gassin, U. S. V. B. Hospital No. 32, 2650 Wisconsin Ave.

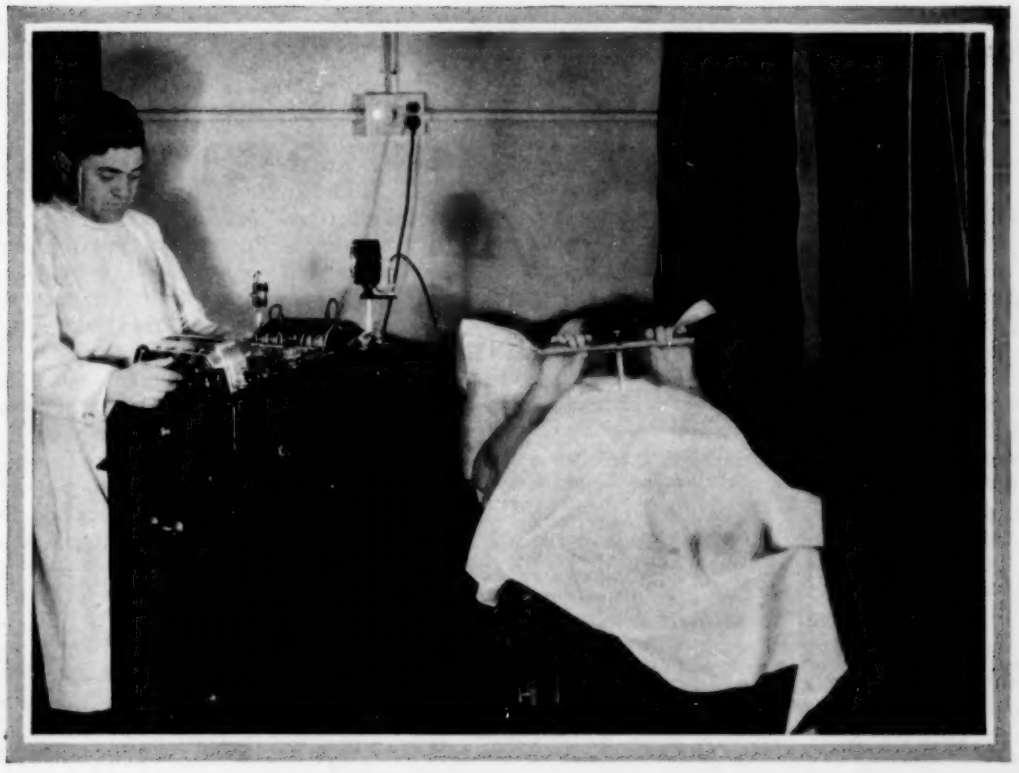
MASSACHUSETTS PHYSIOTHERAPY ASSOCIATION, INC.
President, Miss Clara M. Eisenbrey, 360 Riverway, Boston.
Secretary, Miss Stella Ross, 9 Vancouver St., Boston.

PENNSYLVANIA PHYSIOTHERAPY ASSOCIATION, INC.
President, Miss Lucy Windle, 1729 Spruce St., Philadelphia.
Secretary, Miss Louise Jetter, 17 East Style St., Collingswood, N. J.

WASHINGTON PHYSIOTHERAPY ASSOCIATION
President, Miss Elsie Child, 311 Douglas Building, Seattle.
Secretary, Miss Dorothea Sorenson, 2107 Warren Avenue, Seattle.

AMERICAN PHYSIOTHERAPY ASSOCIATION, Michigan Chapter
President, Miss Anna L. Mulcahey, Leland School, Detroit.
Secretary, Miss Norma Graham, 25 East Palmer Ave., Detroit.

AMERICAN PHYSIOTHERAPY ASSOCIATION, New Jersey Chapter
President, Miss Jean Smith, 5 Berkeley Heights Park, Bloomfield.
Secretary, Miss Emily J. Griffin, 21 Church St., Montclair.

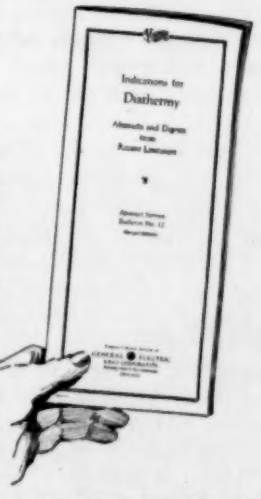


When is Diathermy of Value in Your Practice?

YOUR decision to use diathermy in the treatment of any condition will, of course, be based on recognized medical authority. Many physicians have become interested as a result of observing the many references to diathermy in current medical literature, and no doubt intend to investigate for themselves when opportunity presents. But a busy practice affords little of the time required in searching the files of the medical library, and it is put off indefinitely.

A preliminary survey of the articles on diathermy, published during the past year or so, is available to you in the form of a 64-page booklet entitled "Indications for Diathermy." In this booklet you will find over 250 abstracts and extracts from articles by American and foreign authorities, including references to more than a hundred conditions, in the treatment of which the use of diathermy is discussed.

If you number yourself among the physicians who have not adopted diathermy in practice, and desire to investigate this form of therapy in view of reaching your own conclusion as to its value in your practice, you will find this booklet a convenient reference. A copy will be sent on request.



GENERAL ELECTRIC
X-RAY CORPORATION

2012 Jackson Boulevard Chicago, Ill., U. S. A.

FORMERLY VICTOR X-RAY CORPORATION

Join us in the General Electric Hour broadcast every Saturday night on a nationwide N. B. C. network.

General Electric X-Ray Corporation
2012 Jackson Blvd., Chicago.

Not being a user of diathermy in my practice, please send your 64-page booklet "Indications for Diathermy."

Dr. .....

Address .....

City ..... State .....

VOLUME X NUMBER 3

The Physiotherapy Review

MAY-JUNE, 1930

PUBLISHED BI-MONTHLY BY THE AMERICAN PHYSIOTHERAPY ASSOCIATION

Publication Office: 404 N. Wesley Ave., Mount Morris, Ill.
Editorial Office: 21 Church St., Montclair, N. J.

Editor-in-Chief:
DOROTHEA M. BECK,
21 Church St., Montclair, N. J.

Entered as second-class matter Oct. 6, 1927, at the post office at Mount Morris, Ill., under the Act of Aug. 24, 1912.

General Manager:
GERTRUDE BEARD,
2449 S. Dearborn St., Chicago, Ill.

Address all correspondence for publication to the Editor.

Membership in the American Physiotherapy Association is five dollars a year, including two dollar subscription for THE PHYSIOTHERAPY REVIEW. Single copies 35 cents. Subscription for non-members to THE PHYSIOTHERAPY REVIEW $2.50 a year. Single copies 50 cents

Two Active Principles of Physiotherapy from the Standpoint of a General Surgeon

By Francis M. Findlay, M. D.

Read before the Massachusetts Physiotherapy Association, Inc.

I wish to speak this evening from the standpoint of a general surgeon on some observations I have made concerning the use of physiotherapy in fractures in or near the joints. At the outset I wish to make it perfectly clear that I feel that physiotherapy has a definite and very useful place in the treatment of all fractures, and that we as surgeons are very dependent upon physiotherapists. However it seems to me from observations in a rather active out-patient service, that far too often patients are treated needlessly and unwisely. I feel that physiotherapy has two active principles to keep in mind. First, baking, and second, massage.

The baking is of value in nearly every case because it increases the blood supply to the injured part and in this way promotes heating and encourages early return of function. I know of no patient who is not benefited and made more comfortable by the use of baking if it is intelligently applied. However, I do not believe that baking whether it be any form of external heat or diathermy, will alone be of aid in returning function to injuries near the joints. Far too often patients come to clinics and have an electric baker waved in their direction for months at a time, while their joints become stiffer and stiffer.

The second main duty is massage. Massage and active motion should never be started until there is evidence of beginning bone union. If you begin to move a joint near a fracture before there is bone union you will only invite swelling, stiffness and increased callous. Fractures in and above the elbow joint are perhaps a best illustration that I know where early massage does harm. It is necessary to wait until the fracture is healed, for any active motion simply increases the callous, resulting in a large bone overgrowth and permanent disabling stiffness. Fractures of the wrist, on the other hand, unite early and here every effort should be employed to obtain early and complete motion. I believe that no one should be treated for more than two weeks at a time with physiotherapy without the doctor in charge seeing the case, especially if the injury was a comparatively recent one. The doctor is responsible and upon him should rightly rest the decisions as to the amount and character of the treatment given.

In conclusion I state that physiotherapy like any other form of treatment is only an aid to nature, and we must not take credit to ourselves for the things that nature does. The tendency seems to me is to overdo in our cure of cases.

(Following this X-Rays of typical cases of fractures in and about joints were shown.)

475 Commonwealth Ave., Boston, Mass.

Myofibrositis—Discussion of Its Causes

By Jerome H. Samuel, M. D.

From the Department of Physical Therapy, Beth Israel Hospital, Newark, New Jersey

More than thirty percent of the patients treated in some departments of physical therapy consist of those who are suffering from "myositis," of different types —cervical, brachial, lumbar, gluteal, et cetera.

From the viewpoint of anatomic structure alone, this term is inadequate, since a muscle consists of bundles of fibers separated by connective tissue septa, while the entire muscle itself is enclosed within a sheath of areolar tissue. Fascia, a dense, inelastic fibrous membrane, affords an investment for individual muscles and groups of muscles. Furthermore, muscles are connected with bones, cartilages, ligaments and skin, either directly or indirectly thru the intervention of fibrous structures—the tendons or aponeuroses. Therefore, an involvement of muscle fibers alone cannot be considered since there is such a close inter-relationship between these various forms of connective tissue, particularly the fibrous elements.

Accordingly, Llewellyn and Jones, in their exhaustive exposition of "so-called chronic rheumatism" and allied conditions, have substituted the term "Fibrositis," which is based on pathologic anatomic changes. Myositis itself is designated as myofibrositis; joint involvement is termed as articular fibrositis; and nervous tissue involvement is called neurofibrositis, in accordance with their system of nomenclature.

Commonly, during the initial attack of fibrositis, salicylates or the coal tar product group, heat and massage are prescribed. Within a short period, pain in the neck, shoulder, back, or other affected area, disappears. More commonly, the symptoms are alleviated with no treatment, for many of these patients seek no medical advice, should the discomfort be mild in character.

No significance is attached to this acute inflammatory process of short duration; perchance, another attack may ensue the following year, or after a period of several years. The usual diagnosis of myositis, neuritis or neuralgia is made without any attempt to delve into the problem presented.

Pathology of Myofibrositis

For a clearer understanding of fibrositis, particularly of myofibrositis, it is necessary to study the microscopic changes seen in affected muscles.

On careful palpation of the involved muscles localized points of tenderness can be elicited between the points of origin and insertion of a muscle. Furthermore, these sensitive regions will demonstrate small areas of induration or thickening, of varying degrees of consistency, this depending upon the chronicity of the process. The thickenings are called nodules, so familiar to the fingers of trained masseurs.

Virchow, in 1847, demonstrated the presence of an inflammation of the interstitial tissues with secondary implication of the muscle fibers. More recently, microscopic examination of involved muscle tissue, particularly in long standing cases, reveals fibrous tissue hyperplasia, degeneration of muscle fibers, peri-arteritis and endarteritis, and a lack of local leucocytic reaction. Often, extension to nerve sheaths is demonstrated, giving rise to a peri-neuritis when limited to the sheath itself and an interstitial neuritis when the nerve fibers are involved. This is a direct extension of the morbid change from the contiguous fascial or aponeurotic structures.

Grossly, for example, in sciatica, the original site is often located in the lumbo-sacral fibrous tissues, with direct extension to the sciatic notch in the neighborhood of the nerve sheath. Likewise, in brachialgia, the original seat of inflammation is located in the deltoid muscle, which, spreading inwards, involves successively the subdeltoid bursa, capsule of the joint, the joint itself, and ultimately the sheath of the brachial plexus. These findings are indicative of the action of bacteria or toxins.

It can readily be seen that the naming of the inflammatory process is simply dependent upon its anatomic location, and that as there is spreading of the process from muscle to bursa, to joint capsule, to joint, and then to nerve sheath, the diagnoses deltoid myofibrositis, subdeltoid bursitis, peri-arthritis of the shoulder joint, articular fibrositis of the shoulder joint and brachial neurofibrositis, constitute the same inflammatory process.

Consideration of Etiologic Factors

The general etiologic factors may be classified as follows:

I. Predisposing factors.

A. *Age.* These conditions are more common after the second decade. A suggested explanation for such age incidence is that until this particular decade in life the general hygiene thru infancy, childhood, puberty and adolescence, is carefully watched at home, in the public schools, high schools and colleges. In the middle twenties, however, the individual has fewer hours for outdoor life and exercise, because of the newer duties of struggle for existence.

B. *Sex.* This condition is more frequent in males the incidence in certain forms of myofibrositis being one hundred percent greater than in females. Males are more frequently attacked due to their occupations, exposure to the elements and general tendency to irregularities of life.

C. *Heredity.* Often it is noted, in members of certain families, that these individuals are particularly susceptible to attacks of myofibrositis. No satisfactory explanation can be advanced for this constitutional stigma.

D. *Infection.* A condition of subinfection exists in those affected with myofibrositis. That is, there is a latent infection within their bodies at all times, but depending upon the powers of immunity and resistance, they are able, to a greater or lesser degree, to overcome the effects for certain periods of time. When the infection gains the upper hand, symptoms arise.

This question of balance is easily demonstrated in our daily life experience. For example, a man with pulmonary tuberculosis may harbor the infection in his lungs and remain apparently symptom free for several years, consequently not becoming aware of its existence until there is a breakdown of his powers of immunity. Again, one may have an infected tooth with a large peri-apical abscess which may disseminate bacteria or toxins or both for months or perhaps years, and only when

he is unable to successfully combat the infection, may it gain foothold in a muscle, joint or other structure.

Under conditions conducive to a lowered resistance, these fibrositics who harbor dormant infections flare up when undue stress and strain from a variety of causes will upset their balance.

The infecting organism may be specific or nonspecific. The gonococcus, the tubercle bacillus and the spirocheta pallida are the chief specific offenders which may be lodged in organs or tissues over a period of years after their entrance into the body.

The streptococci, hemolytic and non-hemolytic, may be included under nonspecific organisms. They are of various strains and mutation forms.

It is probably safe to expound at the present time that, although attention is centered upon muscle pathology, there is a general systemic infection and that if the particular organism in question is capable of attacking the connective tissues of the muscles, it may also be capable of involving connective tissues of other organs. E. G., the heart muscle, to bring about myocarditis and the bronchial musculature to bring about bronchial and peri-bronchial infiltration. In acute rheumatic fever there is a generalized septicemia with involvement not only of peri-articular tissues, but also heart muscle, subendocardial tissue, the pericardium, pleura and meninges. Likewise, gonococcal infections of the urethra lead to a general septicemia which fortunately, in the vast majority of cases, causes no damage, but in some may bring about joint, heart and meningeal involvement.

From the view-point then that either an acute or chronic attack of pain in the region of a muscle or group of muscles is simply a local manifestation of a general condition, the offending organism should be present in the blood stream and in the affected tissues. Newer bacteriological technique has enabled certain workers to isolate organisms from the blood stream, particularly in the articular types of fibrosisis. Since the musculo-fascial type is so closely related, organisms, analagously, can most probably be isolated in blood cultures.

1. *Foci of Infection.* It follows, therefore, that if bacteria are present in the blood stream they must have arisen from some one or more foci. The gums, teeth, tonsils, nasal accessory sinuses, gall bladder, colon and prostate are the primary sources of focal infection. In addition, the affected tissues themselves may act as secondary foci.
   a. *Gums.* An apparently mild pyorrhea should never be overlooked as a source of bacterial infection.
   b. *Teeth.* Dead teeth with root canal fillings should be treated with suspicion. Infection may be going on in the peri-apical region of a tooth with root canal filling, with no local symptoms for months and perhaps years. Impacted wisdom teeth frequently are infected, while some members of the dental profession claim they are almost invariably infected. Edentulous areas surprisingly often harbor unextracted roots. A dental focus of infection cannot be ruled out until clear, well taken dental x-ray films have been made, and it should be remembered that even though no pathology about a dead tooth is demonstrable by this procedure, a certain amount of soft tissue damage about the apex of a tooth must have taken place before it will render a shadow upon an x-ray film. A vitality test of each tooth (passage of a current of 1-10th milliampere) must be performed, removing crowns from capped teeth when doubt concerning the vitality of such teeth exists.
   c. *Tonsils.* The tonsils are a long-recognized source of focal infection. In addition to inspection under good illumination, they should be squeezed between two tongue depressors in order to express any purulent material that may be present. Tonsillar tags, not infrequently, are more serious offenders than the original tonsils themselves.
   d. *Nasal accessory sinuses.* Nasal accessory sinuses cannot be ruled out until transillumination, x-ray films and sinus exploration by some method has given negative findings.
   e. *Mastoids.* A chronic mastoiditis subsequent to a chronic otitis media should not escape attention. X-ray films may aid in the verification of such a condition.
   f. *Colon and gall bladder.* In the writer's experience, the colon is the chief offender in these cases. Superficial questioning commonly elicits no positive findings, but close interrogation of such symptoms as the presence or absence of gaseous eructation, "heartburn", sense of abdominal fullness and distention, number of attacks of "indigestion", the frequency, size, shape, water content, color and odor of stools, and the frequent or infrequent use of laxatives and cathartics, combined with inspection to determine degree of laxity and distention of the abdominal wall, palpation to determine regions of colonic tenderness, and percussion to determine the amount of stomach and colonic over-distention, a diagnosis of colonic pathology, which may act as a site of infection, can be made.

      Gall bladder pathology commonly arises secondarily from colonic pathology. It is not an important offender.
   g. *Prostate.* The prostate glad is frequently disregarded as a focus of infection. A previous genito-urinary infection may lead to the lodging of bacteria within the substance of the gland.

Commonly, a patient may have two or three foci of infection, which must be eradicated.

In a minority of cases the initial symptoms are noticed after brief infections, notably grippe, influenza, acute rhinitis, pharyngitis, laryngitis or bronchitis—those short, acute inflammatory affairs which subside quickly in signs and symptoms, but whose after effects may be experienced several weeks later. Often, two weeks after the cessation of a grippe infection, there appears an acute pain in some musculo-fascial region.

II. Exciting causes.

The predisposing factors just discussed are those agencies which bring about pathological changes in the fibrous structures. The exciting causes, now to be mentioned, are those elements which determine outbreaks or exacerbations of myofibrositis.

A. *Atmospheric influences.* The prevailing views of atmospheric influences are greatly speculative; still certain observations in regard to states of the weather with their concurrent incidence of fibrositis are well worth consideration.

Exposure to wet and cold. A combination of cold and wet or rainy weather with low temperature and high humidity is an ideal combination for the onset of an attack of myofibrositis, particularly in the period preceding the onset of rainfall.

Varations in barometric pressure. A storm is usually preceded by a fall in barometric pressure or tension This calls for an adaptation on the part of the organism whereby changes of tension within the blood vessels, particularly the capillaries, brings about variations in circulation. A fall in tension is more prone to produce symptoms than a rise. This is seen in the too rapid decompression of deep-sea divers who experience agonizing arthritic and muscular pains (Caisson's Disease). The fibrous tissue in the scar of an appendectomy or laparatomy incision or the fibrous tissue about a healed fracture commonly signals weather changes. Similarly, the fibrous tissue of an inflamed muscle will respond to drops in atmospheric pressure. The combination therefore of cold and wet, plus lowered tension is the most ideal triad for the appearance of "rheumatic" pains.

B. *Climate.* Climate is an important factor in the excitation of an attack of myofibrositis. Rheumatic diseases are less prevalent in very warm or very cold countries, and are more prevalent throughout the temperate zone, especially in humid or marshy districts. Those months of the year which are characterized with the greatest or with the most variable changes in weather bring about a greater incidence of the affection. There are fewer cases during the summer months than during the autumn months while the spring months are the most productive. Many instances are seen during March and April.

C. *Unhygienic surroundings.* Proximity to districts with constant soil moisture—in the neighborhood of rivers, ponds or large bodies of water, is conducive to the development of myofibrositis. A dwelling with damp walls and floors such as a basement, produces a damp cold air which is usually poorly ventilated. This brings about a lowering of resistance of the organism.

D. *Influence of occupation.* An outdoor laborer exposed to the vicissitudes of the weather is more liable to an attack of myofibrositis than one who toils indoors. The former is more subject to chills. A chill is usually brought about by low temperature, a draft and dampness. Under these influences the constant impingement of the air brings about a local cooling of the area of skin exposed. If the individual is not able to adjust himself to these adverse influences, a chill results. Commonly, an attack of fibrositis makes its first appearance upon arising in the morning after some part of the body has been left exposed to damp night air. Bell's palsy, a form of neurofibrositis, is invariably discovered upon awakening after the cervical and mastoid regions have been exposed during the sleeping hours. During the hours one is awake, movements of the body keep the circulation going and develop heat and tend to prevent chilling, but during the night these agencies are at a low ebb.

It is seen then, that a chill lowers the natural powers of resistance and enables pathogenic organisms which may be lurking to gain a foothold in some damaged fibrous structure.

E. *Influence of exercise.* A healthy individual must of necessity, have, among other possessions, perfect body mechanics. To enter a complete discussion of this particular subject is not apropos at this time, but in brief it includes perfect poise—signifying a true anatomical position of the bony skeleton—lack of stress and strain on the ligamentous structures, the presence of excellent tone of muscles, a minimum amount of body fat and good excretory function of the skin. Every joint of the axial and appendicular skeleton must be capable of going through its normal range of motion. Every muscle, in addition to ability to contract, should be able to undergo a full degree of extension. During the early years of life, with pursuit in various games and sports, these movements are well brought into play, but in the later chair-sitting, automobile-riding decades, limitation of such motions and actions of muscles is often abandoned almost entirely, resulting in ligament and joint capsule tightening, with consequent restriction of joint motion, tendon shortening and muscle softening and atrophy.

Influence of insufficient exercise and overexercise. A soft, atrophic muscle soon loses its ability to metabolize, and efficiently and quickly acquires an accumulation of waste products, especially lactic acid. Adequate circulation is most important for muscle metabolism. Exercise is their best circulatory stimulant. An accumulation of lactic acid during exercise brings that "tired feeling." Muscles which are very little used tire very quickly, when exerted even within moderate limits and do not recuperate for some 24 to 72 hours. This is illustrated most painfully to one who attempts to play a game of tennis after twelve months of inaction. This same individual, after a month or six weeks of regular playing, will experience no such aching after the most strenuous of games.

A stenographer who daily sits in a chair which affords little back support will eventually discover that her spinal muscles cannot combat the strain which this position requires and soon loses the ability of maintaining an anatomical position. Broken decompensation of the spinal muscles results with concurrent thoracic kyphosis and a lumbar lordosis. Muscle contractures and overextensions, ligamentous contractures and strains and loss of true anatomical juxtaposition of vertebrae are the consequence. Tissues in such a state soon undergo alterations of normal physiology and become pathologic, being then in a ripe state for the development of an acute inflammatory condition.

Again, if by sitting in a chair with the foreleg at an angle of about 90 degrees to the thigh for eight or more hours a day, contraction of the hamstring muscles is certain to arise, offering an excellent anlage for a myofibrositic attack, perhaps along the course of the sciatic nerve, which may be secondarily involved, for like muscle, aponeurosis, ligaments and tendons, a large nerve trunk, like the sciatic, generously composed of fibrous

tissue, must be fully extended at frequent intervals if it is not to contract or shorten in length.

Those who are addicted to slothful habits of living and over-indulgence in food, call upon their muscles to perform their metabolism beyond normal capacity. They have a state of "auto-intoxication," and it is interesting to note the frequency with which the onset of an attack follows a heavy bout of eating and drinking, with excessive carbohydrate and protein intake.

On the other hand, muscles which are used too frequently and severely are liable to pathologic changes. The constant repetition of a certain set of muscular movements will create a morbid process in a muscle or group of muscles which may consist of minute traumatism or tears of the muscle fibers and capillaries which would distinctly favor a local infection by germs through the blood stream. Over-use of the extensor muscles in painters leads to thickenings which are distinctly palpable and bring about characteristic weakness. Occupational spasms fall into the same category. That such thickenings or infiltrations (nodules) are sites of local infection seems to be borne out by the flaring up of an attack of myofibrositis after a deep, vigorous massage.

SUMMARY

An attack of myofibrositis is of deeper significance than the mere occurrence of an inflammation in a muscle or group of muscles.

Briefly, it signifies the involvement of fibromuscular structures which are in an altered anatomic and physiologic state.

The predisposing factor is chiefly bacterial; the various exciting causes are chiefly atmospheric and climatic. Insufficient exercise or over-exercise are of paramount importance.

Partial Index of Current Literature on Physical Therapy

Bone-Graft Operation tor Tuberculosis of the Spine. Twenty years experience. FRED. H. ALBE, M. D., Jour. A. M. A., May 10, p. 1467.

Constipation. A. J. BEAMS, M. D. and E. M. GERAGHTY, Jour. A. M. A., April 26, p. 1296.

Epicondylitis Humeri. K. G. HANSSON, M. D. and I. D. HOEWICH, M. D., Jour. A. M. A., May 17, p. 1557.

Orthopaedics. I The Surgery of Joints. P. JENNER VERRALL, F. R. C. S., Jour. C. S. M. M. G., May, p. 291.

Prevention of Deformities in Chronic Arthritis. III The Lower Extremity. LORING T. SWAIN, M. D. and JOHN G. KUHNS, M. D., Jour. A. M. A., May 31, p. 1743.

Report of the Council on Physical Therapy, Jour. A. M. A, May 17, p. 1583.

Some Injuries of the Spine. W. C. ALLARDICE, M. D., F. R. C. S., Ed. Jour. C. S. M. M. G., p. 296.

Some Similarities of Birth Injuries to the Brain and to the Spinal Cord

By Randolph K. Byers, M. D.

Read before the Massachusetts Physiotherapy Association, Inc.

In the majority of injuries to the brain, there are found some evidences of spasticity such as increase in reflexes, the familiar adductor spasm of the legs, a tendency to stand on the toes, clonus at the ankle, and in older children, extension of the great toe instead of flexion on stroking the sole of the foot. In the majority of injuries to the spinal cord, on the other hand, there are found evidences of flaccidity, bulging flanks and abdomen, weak hypotonic legs, absent reflexes and weakness. That either type of injury is capable of producing at least some of the symptoms and signs usually seen in the other is a matter of experience which calls for some explanation.

The explanation must be sought in what little is known of the anatomy and physiology of the motor systems of the body. There are present in the higher animals, of which man is a representative, two great cerebral motor systems. From the standpoints of embriology and comparative anatomy, the older of these two systems is that represented by the caudate and lenticular nuclei. It is probable that the movements of the unborn foetus are controlled by this mechanism and it is possible for a short time after birth this is the most active motor mechanism. It is intimately connected with the cerebellum and its motor connections run downward to the red nuclei in the brain stem, where they form synapses with new nerve cells which in turn send efferent fibers to the cord, forming the rubro-spinal tracts.

The other great motor system, present only in the higher forms of life, is the cortico-spinal system. Its cells of origin lie in the cortex of the brain and their cell processes extend in an unbroken tract from the cortex to all the various levels of the spinal cord. The mass of fibers collect together to form a compact bundle which passes between the caudate and lenticular nuclei in the internal capsule and thence downward as the pyramidal tracts, which eventually come to lie in the lateral white masses of the spinal cord.

The spinal tracts of neither system go directly into any of the peripheral nerves, but form synapses with the anterior horn cells which in turn send their motor processes to the various muscles of the body. The anterior horn cells serving both systems are probably identical, and are probably also in relation to several other motor tracts as well as the rubro-spinal and cortico-spinal tracts. It is therefore unreasonable to speak of upper and lower motor neurones without further definition.

More or less is known about the physiological function of these various cells and the tracts. The anterior horn cells and their motor neurones in the peripheral nerves are the final motor pathways through which the voluntary muscles of the body are caused to contract and relax and through which the nutrition of the muscles is in some way controlled. Loss of these cells or their neurones is followed by flaccidity and wasting of the muscles supplied. These phenomena are seen most strikingly after an attack of poliomyelitis which damages the anterior horn cells of the spinal cord par excellence. Condition of the various upper motor neurones in no way influences the result of loss of anterior horn cells or their processes.

The motor system comprising the caudate and lenticular nuclei and certain cerebellar nuclei which finds an outlet through the red nuclei and the rubro-spinal tracts is less well understood. In a general way it may be described as the unconscious motor system; it presides over the putting together of various movements into an harmonious whole, or to express it differently, it controls the associated movements which accompany many acts. The swinging of the arms and trunk in walking are a familiar example of this activity. It also has a marked influence over muscle tone and the maintenance of muscle tone, and it seems probable that perversions of this function may cause such familiar symptoms as rigidity, athetosis, tremor, and possible hypotonia. At any rate, these symptoms are known to appear in certain diseases which affect the lenticular and caudate nuclei.

The cortico-spinal tracts form a much more simple system. It is through them that volitional acts are more entirely controlled. They find their highest development in the control of the small muscles of the hand and their least in the trunk muscles. Injury to the cells or origin in the cortex produces symptoms differing markedly from those produced by injury to the tracts. Cortical injury is usually accompanied by atrophy of the part supplied by the motor area involved, with hypotonia and increased reflexes. The peripheral evidences of such an injury are usually limited to one limb, because injury sufficiently widespread to produce a hemiplegia is very apt to be fatal. As the fibers originating over a fairly wide area of cortex converge, they form a more compact tract which is rather easily damaged in its entire cross section by a small hemorrhage easily compatible with life. Injury to the tracts instead of the cortex is likely to involve a much wider area of musculature and in addition causes the familiar state of spasticity. Such injury may occur anywhere from the point at which the tract becomes fairly compact as it enters the internal capsule high in the brain, to the extreme tip of the tract in the spinal cord. The symptoms of spasticity, of course, involve only the musculature supplied by the tract below the level of injury.

For our purposes, the important points of this discussion are that loss of anterior horn cells causes flaccidity, that interference with the basal gray masses may cause changes in muscle tone, and that injury to the pyramidal tracts anywhere in their course causes spasticity below the level of injury.

These facts are of some significance from a practical point of view in that they may lead to the detection of conditions which very easily escape detection. A very common situation is that in which there is an obvious brachial palsy, but in which there is also more or less damage to the spinal cord, probably

by hemorrhage about the nerve roots of the involved brachial plexus. Such hemorrhage usually involves a relatively short segment of the cord, but is apt to involve with more or less severity in all the structures contained in this segment. The most important damage produced will be to the anterior horn cells in the involved segments, because it is a matter of experience that nerve cells are much more easily damaged than nerve tracts. Injury of these cells may easily cause permanent or temporary disabilities of the muscles supporting the vertebral column. In an infant, such damage may easily escape detection but if we look for other evidences of injury to the spinal cord, we may be able to suspect the loss of anterior horn cells before the local evidence becomes too marked. The most important additional evidence available is that which points to damage to the pyramidal tract as it passes through the level of injury, and would consist of loss of abdominal or cremasteric reflexes, increase in the intensity of the knee jerk, a tendency to cross the leg of the affected side over its fellow in standing, or a tendency to stand on the toe of that side. The presence of any of these signs should lead one to suspect an area of loss of anterior horn cells at the level of injury with posible trunk deformities developing therefrom. It is obvious that the treatment of the brachial palsy should continue unaffected by the presence of a cord lesion, but that in addition development of spinal deformities should be forestalled.

The situation just described is a relatively common one and one which can be often controlled by physiotherapeutic measures. Of much less importance, from the standpoint of numbers, are the children with more or less complete transections of the cord. Such children have obvious severe disabilities which are paraplegic in distribution, with diminished or absent sensation below the level of injury, with a zone of flaccidity and muscular atrophy corresponding to the area destroyed by the injury, and with more or less striking evidences of spasticity below this level. If the transection approaches completeness from the physiological point of view, instead of the usual spasticity there may be substituted more or less elaborate reflex activity. Discussion of this type of case is not so important for the purposes of this paper because to the trained observer the diagnosis is usually more or less obvious.

Cerebral conditions associated with hypotonia are not unusual. During infancy there is often more or less confusion as to the diagnosis as illustrated by the following case:

R. W. admitted to the Children's Hospital at 2½ years of age because of failure to sit up. She was born after a very difficult labor under conditions which precluded good obstetrical care. After delivery, she was critically ill for several days, with attacks of cyanosis, fever, and inability to nurse. Except for the fact that she seemed to notice things and recognize her mother at about the usual age, her development was slow. She always tended to drool and had a good deal of difficulty in swallowing. She had never learned to sit up. On physical examination she was very hypotonic and lay almost immobile on the table. Her abdomen was prominent and bulged in the flanks, her tendon reflexes were almost impossible to elicit and and her abdominal reflexes were absent. When an attempt was made to sit her up, her head flopped about uncontrollably. She had no abnormal reflexes. Sensation to pin prick appeared normal.

If her examination were limited to the legs and abdomen, it would be practically impossible to say she did not have a lesion of her spinal cord of the usual type involving the anterior horn cells over a large segment of cord. The facts which point away from such a diagnosis are that her arms and neck are involved in the same weakness (a cord injury extending so high would probably cause death from respiratory paralysis), the drooling which is often a striking symptom in extrapyramidal cerebral palsies, and the history of cerebral symptoms after birth. As she has grown older, she has become stronger and the involuntary movements so typical of extrapyramidal lesions have become very striking.

In the conditions illustrated, it would be only too easy to miss the proper diagnosis. The brachial palsy with accompanying spinal lesion might easily be treated as a brachial lesion alone or as brachial plus cerebral palsy, and only when vertebral deformities became established would the proper diagnosis become evident. The transected cord might easily be confused with a cerebral palsy and the expected response to treatment would not appear. And finally the hypotonic cerebral palsy might be treated as a cord lesion in which case valuable time would be lost in teaching control of the arms and hands. It is, therefore, obviously dangerous to assume that hypotonia is the result of a spinal lesion or that spasticity is the result of a cerebral lesion.

Physiotherapy and the Clinician*

By Harry E. Mock, M. D. F. A. C. S., St. Luke's Hospital, Chicago

Read Before the American Academy of Physiotherapy

Physiotherapy has two attributes, both greatly enhancing is value in the field of medicine and surgery. The one, the scientific side, includes the intelligent use of heat, light and exercise in an attempt to restore function in body disabilities; the other the human side, demonstrates the continued interest of the clinician in his patient, furnishes the encouragement so essential during the discouraging days of a long convalescence and daily renews hope of a final complete recovery with its promise of future usefulness. In so many conditions physiotheraphy is the most important factor in the functional restoration of a disabled part. Therefore, it dovetails between the days of complete disability and the days of complete rehabilitation.

Physiotherapy as a recognized aid to clinical medicine in our country really dates back to the World War. It was ascribed a definite part in the physical reconstruction of the disabled soldiers and soon every clinician connected with this work was asking, "Why have I neglected to use such a valuable adjunct in the treatment of my private cases heretofore?" Prior to this time most physiotherapy had been relegated to the realm of quackery by the physician and surgeon who seldom followed his case beyond the early days of convalescence. The practice then and the practice still followed by too many clinicians was as follows:

The patient was dismissed with instructions to soak the disabled part in hot water, sit in the sun, exercise so many hours daily, have some member of the family massage the part, etc. The patient, soon tiring of these unguided, unintelligent efforts, feeling that all had been done for him that could be done, gradually became a cripple, inefficient if he worked or a selfpitying dependent. Not all fall into this class. Many recovered in time, although the time might have been hastened. Many drifted into the hands of osteopaths, chiropractors, professional masseurs and the like, who furnished treatment that aided in completing their recovery. Occasionally patients were referred to these non-medically trained individuals for so-called physiotherapy. Whether referred or whether sought voluntarily by the patient, the treatment too often was more detrimental than beneficial.

Today our profession is thinking in terms of complete rehabilitation of the disabled which looks to the economic end-result. Every physician is learning that the cure of his patient is judged by the completeness of his functional restoration and by his final ability to carry on. This is especially true in the more chronically disabling diseases and injuries which leave behind them functional and physical sequelae more or less permanently disabling unless continuously treated until these sequelae are reduced to a minimum.

The period of medical and surgical care of such cases is usually referred to as the period of Physical Reconstruction. Lapping over into this period and continuing for varying periods thereafter are the stages of functional retraining, vocational re-education and finally return to economic usefulness. This is referred to as the period of Rehabilitation. To a large extent these two periods are inseparable. Without coordination of their work and co-operation between the surgeon and the specialists in the further stages of rehabilitation the greatest benefit to the patient will not be obtained. The clinicians workshop must therefore be equipped to carry out this program.

Only a few hospitals as yet recognize a further responsibility to the patient than the mere medical and surgical relief of his ailment. Checking the arthritis and discharging the patient with stiffened, deformed joints to await in his home the improvement which without constant intelligent care may never come, is not curing your patient. Treating the fractured femur or humerus until union occurs and discharging the patient with a stiff knee or shoulder joint, is not a cure. Healing the burns but leaving the fingers or other joints deformed and stiff, is not a cure. Responsibility does not end in the cardiac case with restablishing compensation. Note the number of times a heart case has drifted back to the hospital because adequate retraining exercises, careful follow-up of the patient and provisions for suitable employment were not attended to. To cure tuberculosis or some other protracted disability, as some severe trauman, and then discharge the case as a hospitalized individual or one who has developed some other form of neurosis, is not rendering adequate or complete service to the patient.

Therefore, the enlightened hospital of today must install additional facilities acting as adjuncts to the medical and surgical treatment of disabilities. The aim of these adjuncts must be the attainment of the greatest degree of functional restoration and to assist in the final rehabilitation of each patient.

Physiotherapy, that is, the adaptation of proven physical measures to theraupeutive purposes, furnishes the most important adjunct. Every disabled hospital case will not need all of these physical measures. The majority would be greatly benefited by the use of one or more of them. No one of these measures is a cure-all, but it is the intelligent combination of the different therapeutic agencies that gives the best results.

If a hospital is equipped with a physiotherapy laboratory the physical measures can start almost simultaneously with the usual medical and surgical procedures. The rule now is when physical measures are needed to wait until the patient is discharged from the hospital and then turn him over to a physiotherapy laboratory or too often to a masseur, or allow him to seek these adjuncts at the hands of osteopaths, chiropractors or others unfamiliar with the treatment already given or with the best means of attaining the desired end. Too much emphasis cannot be given to the fact that this is essentially medical treatment which should be furnished by a trained physician acting in close co-operation with the surgeon or internist responsible for the cure of the patient.

Frequently physiotheraphy must continue for weeks after the primary medical or surgical treatment has ceased. In these cases it is better, if possible to discharge them from the hospital and hospitalizing influences. The next essential and one which must be met by our hospitals in the near future, would be a suitable convalescent center equipped for physiotherapy,

*Reprinted by permission from "The Industrial Doctor."

vocational education, workshops and other rehabilitation measures. In the absence of such a center the hospital should provide an out patient service for patients needing further physiotherapy care.

When clinicians and hospitals add this service to the list of many other services they have provided, they will accomplish the following:

(a) Prevent a great many permanent deformities.

(b) Prevent many cases of functional neuroses so prevalent following prolonged hospital, medical and surgical care.

(c) Shorten the period of disability.

(d) Turn patients out not as cripples, but as rehabilitated individuals, that is, ready to assume their social and economic duties in spite of physical handicaps.

The author is a general surgeon, not a physiotherapist. Just as he uses the internist, the laboratory specialist, the roengenologist, the eye, ear, nose, and throat specialists and the dentist, to assist him in the diagnosis and treatment of his cases, so he has learned to depend upon the qualified physiotherapist for the same ends.

He has knowledge of the general principles of physiotherapy, but it is not necessary for him to know all the details of this form of treatment any more than to know all the details of X-ray work or certain nasal operations. Therefore, in order to illustrate some of the clinical advantages of physical therapy, it will not be necessary to describe the details of the treatment given.

Fortunately, he is associated with Dr. John S. Coulter, a man extremely well qualified in physiotherapy who has developed in Chicago a large physiotherapy laboratory. Because of his help and his handling of the secondary stage of treatment, better and more lasting results are being obtained in a large percentage of cases. The hospital where the author works furnishes limited facilities for physiotherapy, but even these are of great value during the hospitalization of patients. Many cases are able to be referred daily to the physiotherapy laboratory when more extensive physical treatment is necessary.

The chain of treatment in many chronic cases can be divided into two stages and includes the following:

(a) Primary stage or hospital stage.
  (1) Surgical treatment, operative and non-operative.
  (2) Routine surgical dressings.
  (3) Physiotherapy while in the hospital.

(b) Secondary stage or after the patient is able to leave the hospital.
  (1) Physiotherapy at the physiotherapy laboratory.
  (2) Surgical dressings if still necessary in the surgical dressing room of the laboratory by an assistant familiar with the case.
  (3) Teaching some member of the family essential features of physiotherapy to be administered by them when patient is from out of town; patient to report back for more extensive treatment weekly or fortnightly.
  (4) Weekly examination of patient by surgeon and consultation with physiotherapist to observe progress and to guide treatment to its desired end.
  (5) In certain cases referring them to proper agencies for retraining for work and replacement at suitable employment, thus completing the cure to the period of economic usefulness.

Without the aid of physiotherapy both in the hospital and after discharge, this rehabilitation of a great number of patients could not be accomplished.

A few case resumes will best illustrate the need and use of physiotherapy.

1. F. D., female, age 16 years, when 14 months old fell three stories and fractured skull. Walked at 3 years, but paralyzed in right arm and leg, developed a spastic equinus and aspastic flexion of forearm to right angle; at 14 began to have contracture seizures in foot, then leg and later in arm; would not lose consciousness, but would see red lights and cry out just before seizure began; attacks at first two or three weeks apart, became almost daily. Patient referred from Washington to my service January, 1924. X-ray showed depression in skull with piece of bone lying deep in brain substance; location was just anterior to left fissure of Rolando area near Sagital suture. Operation: Craniectomy, depressed area removed, fragment of bone 2″ by ½″ by ½″ removed from brain cortex about 1″ below surface. Physiotherapy: Absolute rest for 3 weeks, then light occupations, light stroking massage, hydrotherapy to arm and leg; at end of six weeks brisker massage preceded by heat and hydrotherapy resistance exercises very mild, and light exercise of each individual muscle by use of Bristo coil. The mother was taught each of these maneuvers, including use of Bristo coil which she purchased. At end of two months child returned home and mother continued this physiotherapy under guidance of family physician. Recent report states that child had one slight seizure in foot two weeks after return home, but no further seizures in the 18 subsequent months which have now elapsed; right arm can be extended 50% more than before operation, atrophy of muscles has improved, and while leg is shortened and equinus condition persists to certain extent, yet child walks better.

2 P. A., carpenter, age 37; injured Oct. 21 by falling off shed; treated for strain of back at his home (small town, no hospital). Referred to my service two years later as patient; had not been able to work since injury. General organic examination negative; functionally patient walked with short, shuffling steps, bent forward with back held rigid, could not raise arms over head, had resigned expression on face. A typical area of anesthesia present on back and lower extremities. Diagnosis traumatic hysteria. Patient sent to hospital and routine adopted consisting of: 8 a. m., baking of back and limbs; 8:45, hot, then cold shower bath; 9:00 massage with increasing vigor every day; 9:30 muscle resisting and calisthentic exercises; 10:00, work in occupational shop. Lunch and rest. 2 to 4 p. m., work in shop using lathe, carpenters' tools and increasing daily in intensity. Every day examined by surgeon and improvement carefully charted. At the end of 10 days this patient was so interested in his work that he had unconsciously forgotten many of his hysterical symptoms. On that day his case was carefully explained to him, he was put through all movements which formerly he was unable to perform, and at his own request was discharged as a cured case. A few weeks later a letter from him stated that he had worked as a carpenter every day since returning home.

Physiotherapy has enabled the author to correct many cases of traumatic neuroses. On the other hand, routine physiotherapy without intelligent guidance and careful selection of cases has been responsible for creating many cases of neuroses just as any line of treat-

ment may do if it enhances the seriousness of the conditions in the patient's mind. The greatest improvement comes from daily showing the patient that he can do the things he says he cannot do. Increasing the doses up to the point of being almost punitive in character is often necessary in these cases.

3. E. C., female, 5 years old, a case of spastic paraplegia, brought from a small town in Florida. No operative procedures indicated. The child and her mother were referred to the physiotherapy laboratory where the mother was taught to give massage and every form of muscle training exercise suitable to these cases. After 4 weeks she returned home; mother has written that child shows improvemnt and in addition she is giving similar treatments to three other paralyzed children.

4. T. M., male, 40 years old, fell from scaffold and fractured right femur transversely 5" above condyles; a longitudinal fracture through the condyles extending into the knee joint; condyles rotated outward and pulls backward almost to a right angle with the shaft. Calipers inserted into the condyles, a Thomas leg splint applied and traction made through calipers to the lower fragments. Motion maintained in the knee joint to 25° from the start of treatment. Massage given to upper and lower extremities during hospital care. On discharge he was referred to physiotherapy laboratory for hydrotherapy, massage and joint re-education. At the end of six months can walk, extend leg completely and flex it to a right angle, although on discharge flexion was limited to 25°.

5. Of all joint cases referred to the author for reconstructive surgery, partial ankylosis of the shoulder joint following injury is the most common. The stiffnesses is usually due to the prolonged immobilization of the arm in the adduction position, allowing the strong adductors to become contracted, the weak abductor muscles to become overextended and atrophied, and the various bursal and joint capsules to become contracted and adherent. Some of these cases require surgery, but the majority require a short period of traction in a Thomas arm splint, at the same time gradually abducting the arm; the use of hydrotherapy, heat (hot applications or better, dyathermy), massage and passive and active exercises. During this portion of the treatment, which is ambulatory, the patients wear a Crane-Savoney splint or other form of abduction splint which can be adjusted daily so as to increase the amount of abduction and elevation of the arm. These cases require prolonged physiotherapy care first in the hospital and later in the physiotherapy laboratory and treatment is persistent until abduction, elevation and external rotation of the arm are accomplished to the greatest possible extent.

These few cases illustrate the advantages of using physiotherapy as an adjunct to other forms of treatment. No physician who has had the opportunity of using this adjunct would ever again be deprived of this advantage. It behooves every hospital, and especially those hospitals endeavoring to maintain a high standard of service, to include physiotherapy in its equipment, first as an aid to prevent deforming disabilities, and second, as a means of assisting in the complete rehabilitation of all patients.

A word of warning is necessary unless we want this valuable therapeutic adjunct to again return to the realm of quackery.

It is characteristic of the rank and file of our profession to grab a new remedy or a new operation and extol its virtues for a time finally dropping it for some other innovation. Following this tendency hundreds of physicians have been persuaded to buy some one or two pieces of physical apparatus and to use it in the treatment of practically every case that comes to their office. Some cases are benefitted but for many others there is positively no indication for the treatment. On the latter group the physician is practicing a form of quackery.

The treatment of every accident case, no matter how trivial, with some form of light therapy by certin physicians engaged in traumatic surgery is becoming so prevalent that insurance companies are complaining of the marked increase in medical fees due to so-called physiotherapy charges. In a few states this has become such a pernicious practice that certain insurance companies have refused to sanction the use of any physiotherapy or to pay for this type of treatment.

Energetic salesmen for manufacturers of physical apparatus have been unduly active in lauding the great therapeutic value of this or that special apparatus, and selling them to untrained physicians as a cure-all; often giving the physician a short course of instruction in their usage.

The profession must develop some type of control over the manufacture, sale and use of every type of physical therapy apparatus just as it has over pharmaceutical remedies, otherwise physiotherapy will rapidly degenerate into the worst form of quackery. That practiced unconsciously by honest and ethical physicians.

Physiotherapy is a specialty and should be practiced only by those physicians thoroughly conversant with this form of treatment. It is a component part of medical and surgical practice, just as essential to the successful care of certain cases as dentistry or nursing is in other cases. The clinicians who have learned to recognize the great service physiotherapy can render are heartily in accord with the efforts of your organization to place this specialty upon the highest plane of professional endeavor.

Some Principles Used in Electrotherapy

By Charles R. Brooke, M. D.

Read before the New York Chapter of the A. P. A. & Inc.

I. STATIC OR FRICTIONAL ELECTRICITY

Static is an unidirectional current of high voltage up to 600,000 volts plus, amperage, low 1 m. a. average 1 to 5 m. a. in 20 plate or in high speed machines. The polarity is distinct: positive pole, sedative and mildly tonic; negative pole stimulant and vigorously tonic; electrolysis, none; ionization, none. Different forms of application: Static, insulation, breeze, spray, wave current, brush discharge, static induced, blue pencil discharge and resonator discharge.

Static electricity is generated by friction and influence. A static machine consists of a varying number of revolving plates made of glass, mica or paper covered with a solution of shellac as an insulating material. It has an equal number of larger stationary plates, some of which have inductors, or charge collectors, which have collecting combs and neutralizers. These are all enclosed in an air tight case.

Static currents are unidirectional, with a tremendous voltage, and it forces its way through the body tissues, exciting mechanical response with contraction of the muscle mass with mass contraction of the cells, expelling into the lymph channels the accumulated efete cell residue. When the flow of the current is interrupted, as in the wave application deep seated rythmical contractions are set up in the tissues, thus favoring mechanical drainage of the tissues or parts so exposed.

Its polarity is distinct, the positive is sedative, the negative is irritative. It has no chemical effects as the galvanic current possesses, and has limited thermal effect, but has a decided mechanical effect.

The disadvantages of a static machine are, its bulk, the amount of floor space necessary for its operation, its liability to breakage, its unreliability in certain atmospheric conditions and the difficulty of transportation. But all of these draw backs can be overcome and should be, for in certain conditions it holds a field peculiar to itself.

The galvano slow or rapid sinusoidal, the Bristow faradic, and the static wave produce somewhat similar results, except that the static wave has a much greater push power and greater constitutional effects, due to the fact that the entire body is stimulated as well as the local part under treatment.

The physiological effects of static electricity are both vascular and lymphatic, due to the muscular contractions which force, when stasis or congestion is present, the fluid contents of the tissues into the direction of the various outlets. Pain is relieved when exudates are removed. The capillaries are dilated, restoring a stagnant circulation to normal, thus softening hardened tissues and relieving pressure and pain. There is also a metabolic effect, as is shown by increase of solids in the urine.

The effects of the static current vary with the type of machine, size, speed and number of plates, the method of hooking up and the size and character of electrodes. There are two important factors in the use of a static machine without an understanding of which successful results are not possible. These are polarity and grounding. There are many tests for polarity but there is one simple one that never fails when the machine is working and thus is much more reliable than the others.

Proceed as follows: Having machine charged start in full speed and separate the main terminals about four inches. Take a dry piece of wood at least 20 inches long and approach the end to one of the main terminals, moving it around in a circle on the surface of one terminal and then the other. On the positive side the current will follow the wood, on the negative it will not.

The grounding wires should be suspended at least 3 feet above and 1 or 2 feet in front of the machine and must not come nearer to the machine than this point. It is best stretched across parallel with the long axis of the front of the machine. One end can be fastened to any convenient place the other leading to the water pipe or a copper pipe driven into the ground.

Physical Properties: The evolution of the static current is unique. The energy of the motor, by turning the revolving plates seems to rend, as it were, the gasses between their surfaces and the surfaces of the charged parallel stationary plates, creating by means of the energy expended from the substances present in the gases, another form of energy, electricity, positive and negative in equal quantities is evolved.

The energetic mechanical method by which the static current is evolved is unique, and carries with it the mechanical quality. The extent or degree to which contraction can be produced, the distinctive, diffused, plainless contraction of the static current from a modern static machine is remarkable. It will effect the largest and most deeply situated muscles of the human frame, particularly so when metal electrodes are employed over the affected parts. This contraction is usually painless, except when involving inflamed tissue or when a potential, measured by the length of the spark is employed long enough to make the contraction severely tonic. This effect, as stated, is substantially peculiar to the currents of the static machine. This mechanical feature of the static discharges is strikingly characteristic of them; not that other currents do not produce contraction, but that their quality varies in being less potent, more painful and less diffusive, other things being equal. The unipolar quality is most marked when produced under relatively low rates of speed. This unipolar quality is valuable when the demonstrable difference in the effects of the positive and negative electrons upon the tissues is considered, becomes less and less defined as the rate of revolution is increased, because the neutralizing combs fail to prevent the possibilities of alternation of the universe currents of the Rhumkorff coil. For relatively unipolar effects the rate of revolution should not exceed about 300 per minute.

Hook-ups for Various Modalities

1—Sparks indirect: Patient on platform to positive pole, negative pole not grounded, spark electrode is grounded. The intensity of all sparks can be regulated in a measure by varying the speed in the machine, by leaking off a part of the current from platform by the operator approaching a foot or resting it on the

edge of the platform or by approaching main terminals close to each other, so that a good part of the current breaks across the terminals. If not strong enough, use the direct hook-up. For direct sparks: Patient on platform to positive pole negative side of the machine is grounded, the spark electrode is grounded to the same or separate ground, regulator as before. If the maximum spark attained is not yet strong enough, hook on leyden jars connecting the bases across, ground and proceed as before.

The Static or Morton Wave: Patient on platform to the positive pole, negative pole is grounded, the leyden jars are on or off (we prefer them on) regulate speed of machine so as to secure not over three or four discharges per second (we consider three better than four) as this gives the tissues a period of rest between each contraction. It is an absurdity to so manage the machine that a continuous shower of discharges are occuring across the spark gap as this tentanizes the tissues, produces irritation instead of sedation, overtires the muscles and defeats the object of the treatment. The wave should be ten to twenty minutes in length, depending on the condition and the part being treated. We favor fifteen to twenty minutes where possible.

DeKraft or Blue Pencil Effleuve, Brush Discharge: Patient on platform, to the negative pole, positive side of the machine is grounded, blue pencil electrode is grounded, leyden jars not attached, main terminals are widely separated, machine operating at full speed. This is used for sedative effects, time being from five to fifteen minutes for any one part, keeping the electrode gently moving at all times. The discharge can be made irritating by giving it through resistance, as wool, chamois, etc. The sparks used to relieve pain, relax muscular spasms, to break up unorganized plastic exuadate. If too late to use sparks, use diathermy to soften it up and then use the sparks. Sparks relieve pain by relieving pressure on the nerve endings, use the wave to massage it out. Some of the advantages of the wave are: It can be used in places where manual massage would aggravate symptoms, such as neuritis. This is because the wave while producing muscular contraction does not traumatize the structures by violent over-exertion, crushing, bruising, etc., but handle each individual cell, thoroughly vibrating it without trauma. It is a decongester of tissue, but one should not expect it to de-congest the nerve, chronically inflammed until it is almost as hard as a pipe stem. In acute neuritis the wave alone is sufficient or the effluve, sparks and wave, but in chronic neuritis the nerve must be prepared for treatment by softening with some form of heat. No form of heat is equal to diathermy for these cases, and many others of similar pathology. It is well to remember that Static makes the tissues and part work while in manual massage you have to work the part.

The Therapeutic indications for the use of the various static modalities are as follows:

Static wave current (1) to soften indurated and infiltrated tissues and organs by the induction of the alternate tissue contraction-and-release effect; (2) to promote absorption by stimulating and circulation; (3) to hasten drainage through the lymphatic channels from localized areas of stasis; (4) to overcome localized muscle tension; (5) to stimulate general metabolism.

The static sparks (1) for softening and disintegration effects on small localized deep seated areas of infiltration, particularly in and around joints; (2) for the localized relief of neuromuscular congestion and inflammation; (3) for relaxation of muscular spasticity.

The static brush and blue pencil effleuve (1) for stimulation of an active hyperemia of peripheral tissues; (2) for the removal of exudates and infiltration in superficial tissues from inflammatory stasis or edema; (3) it removes ecchymosis in traumatic lesions; (4) removes the swelling and hastens the return of normal circulation in peripheral circulatory disturbances by removing the infiltration in the walls of the veins and the surrounding cellular tissue; (5) promotes the return of circulation to unhealed ulcerations of extremities by removing the infiltration and edema from tissues surrounding the lesion.

Static induced current (1) to tone up weak and atrophied musculature in the extremities, and particularly adapted for the simultaneous treatment of two joints or the muscles of the calves of the legs; (2) for the exercising and development of the muscles power in poliomyelitis and residuals of peripheral nerve lesions; (3) for the relief of obesity, because of its decided local mechanical effect.

Vacuum tube wave current (1) for the treatment of inflammation in the various cavities of the body where there is superficial local swelling and congestion of the mucous membranes; (2) for decongestion of the swollen turbinates in intranasal conditions; (3) for relief of recent hemorrhoids.

Contraindications. (1) Treatment of a part where there is liability to hemorrhage; (2) infective inflammation; (3) presence of pus; (4) malignancy.

Care of Static Machine

Foul air in a static machine is much more destructive to its efficiency than moisture in the long run. Nitrous oxide and other gasses are constantly being generated when the machine is in operation, and if allowed to concentrate will settle all over the inside works, condense into a sticky, gummy deposit which will not only catch and hold dirt, dust, etc., but is hygroscopic and will hold moisture once it attracts it. The machine should be given an airing at least once every twenty-five hours of actual running, but, of course, a time should be chosen when the humidity is low, if possible. We have aired our machines even when the humidity was excessively high, as between moisture and a foul interior, we preferred the moisture. The ends are taken out of the machine and it is run for twenty minutes with the ends and top off. The interior should be gone over (the office assistant can do it regularly) with a rag lightly moistened with crude oil or, if this is not obtainable, with kerosene; this is followed by rubbing with a clean dry rag. I take a yard stick, wrap it with oil moistened bandage, lay it between the revolving plates with one end resting upon the axle and turn the plates by hand slowly, and rub them off. Then I lay a thin towel over the stick and turn the plates towards me, making gentle pressure against them, thus cleaning them too. Gases will not gum up a machine so treated, as even if they condense they come off easily at the next cleaning.

Adjustments are provided for moving the stationary plates and collector combs to right or left as needed to clear the revolving plates. The machine should never be allowed to run a minute with a scratch or a rub on it. This destroys the insulation very rapidly and once the insulation is destroyed over any considerable part of a plate (even a single scratch furrow around the plate where a single combe point has moved over touching the plate) that plate is worth-

less as the charge collected on one field piece simply jumps across to the plate, runs up or down the furrow, jumps and neutralizes the opposite charge from the other side so this group of plates is dead. It is common sense and economy to stop the machine and adjust it even during a treatment if a rub or scratch appears.

The mistake of trying to run a static machine with too small a motor should not be made. An oversize motor will give a slow speed range impossible to obtain with a motor only just large enough to operate the machine at full speed. The difference in cost and operation is a very small consideration when increased efficiency obtained from having an oversize motor is considered. On the direct current I use a one-half horse power motor on eight and ten revolving glass plate machines, a one horse power on a sixteen and a two to a two and a half horse power on a twenty-four revolving plate. With these horse powers and a proper control rheostat the plates can be slowed until they are just turning over without stalling the motor.

The static currents have a definite therapeutic value in the treatment of subdilatoid Bursitis, chronic neuritis, sciatica, lumbago, traumata of muscles and joints, teno-synovitis, synovitis, eccymosis and all contusions and sprains. Also has a wide field of usefulness in the treatment of pelvic conditions, dysmenorrhoea, spasmodic strictures, uterine conditions, coccygodyma, epididymitis and prostatitis.

Conclusions

1—In the treatment of the static currents the action is a successive tissue contraction with each discharge at the spark gap. The effects of alternate contraction and relaxation can not be duplicated in rythm, force, and effect by any other electric modality. It must be remembered that the static modalities make the tissues work, thereby removing infiltrate through the lymph channels and so restoring normal circulation and function.

2—The static currents are by far the most efficient method available to-day to relieve tissues of localized congestion, infiltrate, exudate muscle spasm, and pain in non-infective inflammatory conditions.

3—It is urged that every medical institution should have at least one good static machine in the physical therapy department. Since it is now conceded that the static currents have a definite value in therapeutics, and are necessary and important in the office, clinic and hospital physical therapy departments.

4—The degree of success of this physical modality depends upon the operator's knowledge of its basic principles of action and method of employment. Its actions largely mechanical are certain and well defined, and its therapeutic indications are recognized and well established by those who have become rational in its employment. It has been found to be far more than a measure for suggestion in therapeutics.

II. A BRIEF OUTLINE OF THE USES OF THE GALVANIC AND SINUSOIDAL CURRENTS

The action of the Galvanic Current is thermic and chemical and when interrupted is thermic, chemical and mechanical; Electrolysis: breaking up of a compound by the passage of a constant galvanic current; Cataphoresis: ionic medication; Ionization: 1—Acids, bases and salts, splitting up of salts into ions; 2—Splitting up of atoms into ions; 3—Reunion of atoms and ions along path of current; 4—Introduction of substances into the body. Drugs: negative pole: Iodine, Sodium, salicylate, Sodium Chloride (irritant); positive pole: Lithium salts, Zinc, Copper, Magnesium, Cocaine (seductive). In ionization two per cent solutions are used, should be warm and skin cleaned, Zinc and Copper in sepsis, Lithium in gout, Chlorine for destruction of tissue (scar tissues, etc.).

The action of the Sinusoidal Current is an alternating current starting at zero travels complete circuit in one direction, gradually increasing in strength to a given maximum and gradually reduces in strength until zero is reached, at this moment the direction of current is reversed, and travels in opposite direction to maximum and back to zero. Sinusoidal (alternating current varying cycles per second). Rapid Sinusoidal overcomes stasis, promotes metabolism through the mechanical action, promotes nerve and muscle tone. Slow Sinusoidal thermic, mechanical, promotes nerve and muscle tone, assists elimination and metabolism, Surging Sinusoidal overcome stasis, promotes muscle development through its mechanical action and is valuable in intestinal stasis; Superimposed Wave stimulates nerve function and metabolism. Combined Sinusoidal and Galvanic Currents promotes nerve function and metabolism. Has polar properties, a valuable physical measure for relief of many pathological conditions where the nerves are involved and where polar, thermic and mechanical electrical effects are indicated.

Galvanism is a unidirectional current used for therapeutic purposes. The therapeutic applications of galvanism are very varied and the rationale of this treatment is best considered by referring to the action of a constant current passing through an electrolyte. The details of this theory can be obtained from any standard text book on Physiotherapy. The therapeutic benefit of galvanism certainly depends to a great extent on this electrolytic or ionic action. One basic theory is that ions resulting from disordered metabolism, disease and fatigue are driven out of the tissues in which they have accumulated and fresh ions are introduced thus a general ionic rearrangement is brought about.

Galvanic applications may be general or local, usually local, using two electrodes to the part under treatment, one the active electrode is applied to the desired area while the indifferent electrode is placed on some convenient area or a Schnee bath is often used for this purpose. The Therapeutic Effects of Galvanism are: General stimulating (full body or local baths for extremities); Excito motor (interrupted galvanic); Excito sensory; Excito secretory (applied to glands); Sclerolytic; Excito nutritive; Sedative; and Analgesic.

Citation is made of certain applications of galvanism. Central galvanism, application to spinal cord or brain, the latter called often cerebral galvanism, which requires considerable care, electrodes placed over forehead and nape of neck. Current strength three to five milliamperes at first increased gradually to ten milliamperes.

Cerebral galvanism is of great value in many conditions, as will be plain to understand from the consideration of the controlling action of the central nervous system over all the functions of the organism. The following conditions respond favorably (to galvanism): Headaches of nervous origin; Neurosis resulting from sudden mental or physical shock, so many examples of which have been brought to our attention as the result of the World War; Neurasthenia and all forms of central exhaustion due to overwork, worry or preceding ill health. After treatment of gross lesions of the brain, such as hemorrhage, laceration, trauma and concussion, however, treatment should not be started until all activity of the lesion has subsided.

Some joint diseases, arthritis, rheumatism (myositis, neuritis); in certain types of neuritis and in all conditions of peripheral nerves where the nerve paths have been damaged but not destroyed. Galvanism in the interrupted forms is used for stimulation of muscles in palsies applied directly over the motor points. In pelvic disorders for resolution of pelvic exudates, vaginal, cervix and uterine infections using internal electrode, preferably copper electrode and indifferent abdominal electrode pad. Galvanism in ear infections in the form of zinc sulphate cataphoresis has been found to give excellent results. Galvanism is used in clearing up infections and for astringent effects in intra nasal conditions. Adrenalin, cocaine and zinc sulphate solutions are usually used with considerable success in Ionic treatments of the nasal mucus membranes for coryza, rhinitis, hypertrophic, atrophic types and antra disease.

The treatment of Anterior Poliomyelitis by Sinusoidal Current this condition provides one of the most useful fields for the exhibition of sinusoidal currents. The treatment should be started as soon as acute symptoms have subsided and the patient is free from pain. Treatment should be persisted in for several months. The current should be applied to motor points at first then followed by muscle group stimulation, also used in certain types of arthritis and for relief of muscular and nerve pains.

It is essential that paralyzed muscles be left relaxed at all times because electrical stimulation can be of no avail where paralyzed muscles are subject to stretching and strain. Indicated for relief of atrophy and atony of muscles of the extremities following fractures, injury to tissues and peripheral palsies.

Conclusion

The above remarks will serve as a guide along lines that these forms of treatments should advance. And it is believed that these valuable modalities deserve far more use than they have hitherto been employed.

Thermoluminous Medication and the Ultraviolet Rays*

By A. Joseph Riviere, M. D. (Paris), Sc. D.

Read before the American Academy of Physiotherapy.

"To compel nature to dwell with one" (J. J. Rousseau): what more beautiful definition of physiotherapy?

It is in my capacity of a veteran that I am presenting this lengthy study, based on the most recent developments, but corroborated as well by a personal experience of many years. In truth, more than three decades have passed since I had Gaiffe install in my office a powerful arc lamp and construct the first thermoluminous cabinet (which I still have) for the successive utilization of the different rays. Since then I have made use of the various improvements introduced by Finsen, Lortet, Kromayer, Trouvé, Foveau de Courmelles, and others. I shall be forgiven for recalling at the outset this historic past in order to show that, from the very birth of actinotherapy, I have appreciated the therapeutic value of the thermoluminous modalities in relation to humoral metabolism.

When, at the Congress of the Universal Exposition in 1900, I took the initiative in drawing the attention of the medical profession to the curative power of high frequency waves and sparks and of the X-rays on cancer and localized tuberculosis, I emphasized in so doing the importance of ultraviolet rays in this connection. On the same occasion also I said, as our esteemed colleague, Darier, can testify, that radium should likewise possess a definite action on neoplasms by reason of its wealth of X-rays and ultraviolet rays. These considerations decided me to utilize Curie's discovery as soon as it became possible to obtain radium.

(1) Physics informs us of three kinds of solar rays, caloric, luminous, and chemical. It has been demonstrated now that their properties are not distinct. We possess blood cells sensitive to the infrared and thermometers sensitive to ultraviolet.

The luminous bath of the physiotherapy of today (alias artificial heliotherapy, artificial sunlight, etc.) still uses both modalities, thermotherapy, and infrared rays or calorific rays, and actinotherapy properly so called (the chemical rays from the ultraviolet lamp). The latter, being almost exclusively in favor at present, is the special subject of this study.

In reality I consider it frequently of advantage to combine the two methods, especially when a modification or reduction of chemical action is desired for the local protection of healthy tissues. Hyperemia greatly facilitates the absorption of ultraviolet rays when the skin has been well pigmented by them. Infrared is essentially vasodilative: it reduces vascular tension without modifying the composition of the blood; while ultraviolet is vasoconstrictive, ozonizing the tissues and hyperglobulizing the blood. American physicians employ infrared in acute conditions and ultraviolet in chronic cases.

In proportion as the wave length diminishes the stimulating effect of the ray is increased. Localized ultraviolet induces resolvent and destructive effects, pigmentation, erythematous reddening and even burns. Its reactive value with appropriate dosage and intervals of application appears principally in the treatment of dermatosis. As for its general application, in great repute in consequence of recent experiences in the treatment of rachitics, it is applicable, as we shall see, in a multitude of chronic conditions, diathetic and constitutional.

It was long ago noticed that deprivation of light constitutes a principal cause of anemia and lymphatism, a prominent influence in predisposition to scrofula and tuberculosis, especially in children in congested city districts and in peasants' hovels where the sun, a stranger to many climates, distributes its ultraviolet too parsimoniously. Administration of actinotherapy is always warranted in treating urban patients, since even a brief stay at the seashore, in the mountains, or simply in the country, is often prohibitive. It stands proved today that "artificial" insolation cures rickets, anemia, and even mild leukemia, modifies lymphatism, and clearly restores the integrity of nutrition. It effects a fundamental modification of humoral chemistry, diminishes bacteria, restores appetite and muscular activity, and improves digestion and defective assimilation by fixing in the blood the ions of phosphorus, calcium, iron, and other elements. What a miraculous curative agent is the short wave photochemical ray! The calorific ray is incapable of such effects. It is pigmentation by ultra-violet that seems to imprison and develop the vitalizing energy of the blood cells, just as photocatalysis of chlorophyll transforms solar energy in vegetation. The great value of artificial ultraviolet resides especially in its property of extremely rapid vibration, representing, according to Carnot, energy very little modified.

Saidman says "On the surface of the skin ultraviolet releases certain electrons negatively charged."

It is in one of the recent Oxford medical publications that we find the most complete treatise on this subject. "Artificial Sunlight," by Dr. F. Howard Humphris, contains in orderly arrangement all the therapeutic indications which place the ultraviolet ray in the front rank of the physiotherapeutic arsenal. After the necessary historical introduction, the author describes his technique clearly and recommends the apparatus he deems best in various circumstances. Then he exhibits actinotherapy as related to local affections (dermatoses) and general diseases. This discussion is followed by that of the triple action of ultraviolet, stimulative, destructive, and regenerative. The final chapter correctly depicts the X-ray as the complementary auxiliary of the actinic ray, inasmuch as it effects a more complete tissue disintegration in the treatment of lupus or of cicatrices, for example, or of certain tumors.

It has been shown that photoelectrical, photochemical, and photoäbiotic phenomena are observable in all parts of the spectrum. They are much more abundant in the region called "Schumann's" where the rays, absorbed in quantity by the atmosphere, are dispersed only in the open and exhibit a very marked susceptibility to refraction.

Invisible to us, the existence of ultraviolet is shown by the blackening of silver salts and the illumination of certain fluorescent substances—uranium glass,

*Reprinted by permission from "The Industrial Doctor."

quinine, esculine, zinc or calcium sulphate—as it issues in abundance from the quartz windows of the mercury vapor lamp.

Ultraviolet is a promoter of general tonicity, of energy, and of life through the new molecular combinations it effects in the cellular protoplasm. The improvements in modern apparatus permit efficient individual application of the monochromatic rays, which are euphoric and metatrophic, as regulators of nutrition, of secretion, and of sleep, and this in a degree much greater than that attained by the action of natural heliotherapy, lauded by tradition in all these respects.

The work, already old, of Arloing, Charrin, Arsonval, and others has proved ultraviolet to be distinctly bactericide, oxidizing morbid ferments and eliminating toxins. In a few seconds it kills the most virulent bacilli. This is why violet rays so completely sterilize drinking water, by reason of their abiotic property, that is to say by destroying living cell elements.

Administered locally, ultraviolet at first produces an active congestion, accompanied by hypervascularization and hyperleucocytosis. A sort of gymnastics of the smooth fibres causes even sluggish and altered vessels to contract, while the capillaries, dilated by the reaction, facilitate diapedesis and the ameboid movements of the phagocytes—a process evidently increasing the natural defenses of the organism, the "natura medicatrix" of the ancients. In addition, by modifying the nerve endings the rays show an analgesic property, subduing pain and especially the visceral spasms of the liver, intestines, kidneys, and bladder. I am particularly convinced of their power over circulatory function. Bier rightly says that the health of the organs, and so of the organism, is a function of efficient irrigation with blood. Evidently it is by means of this property that edematous and other forms of infiltration are seen to diminish, engorgement to disappear, exudates to become fluid, fibrous adhesions to relax and become detached, those of the parametrium or the pleura, for example, so as to restore to the affected organs their normal position and healthy nutrition.

The evident increase in local metabolism ensures healthy nutrition to the interstitial tissue, exalts and reinforces regenerative cellular life through facilitating the elimination and resorption of pathological detritus and parasitic tissues. In this way parametritis, adnexitis, pelvic peritonitis are caused by ultraviolet to recede, the uratic and tophic deposits, the nodosities of arthritis deformans, and even the vascular lesions of arteriosclerosis to improve under the active changes in cellular activity, the increase of alternative energy, and the regulation of nervous potential. Frequently on the first application every painful symptom disappears. Among the circulatory syndromes most happily influenced by ultraviolet I may include, as do the majority of authors, hemorrhoids, phlebitis, and the crises of hypertension and angina pectoris.

The older clinicians were fond of praising solar light as a preventative and even cure of rachitis. But it is only recently that ultraviolet has been recognized as the most serviceable portion of the spectrum in this condition. Recent experiments made with the mercury vapor quartz lamp have fully proved that, even on the most deficient diet, ultraviolet assures assimilation of lime and phosphorus in infants, overcomes the general state of atony, makes walking possible, and even affaces osteoarticular stigmata. Nevertheless, the effect appears general, not local, for the rays, without affecting the skin, act only through the blood contained in the capillaries and by stimulating the cutaneous nerve endings. However this may be, the consequences are intestinal assimilation of phosphorus and calcium and resulting phosphocalcemia—consequences rendered unquestionable today by the excellent work of Lesné and de Gennes, based on experimentation in the lower animals (rats) and rigorously controlled by clinical observations of sufficient extent.

Yes, the luminous excitant exerts its influence on the fixation of calcium, the framework of our tissues. It overcomes the most resistant forms of plasmatic anemia by means of calcemia and phosphatemia. Examination of serial radiographs in confirmed rachitics discloses intensive calcification of softened bones, organization of ossifying fringes, and diaphyso-epiphyseal proliferation. At the same time muscular action is correspondingly restored and spasmophilia, that inseparable accompaniment of rickets, disappears. Children whose development is retarded are sometimes seen to walk after a few applications of ultraviolet. R. Mathieu and Madame Feldzer reported to the Pediatrical Society the cure of pseudoleukemic anemia in young infants. The numerous experiments of Bohn and Vagliano on rats also prove definitely the power of ultraviolet in recalcification and growth. Finally, Turpin and Zizine lay stress on the corresponding variation in total blood content of calcium caused by irridiation, which has a most pronounced eutrophic effect on organs in process of development. They relate the fortunate results of employing artificial rays "in large cities and in regions of feeble luminosity in promoting the development of infants and in preventing and curing rickets and spasmophilia."

As a tonic the violet ray is superior to all other known methods. It effects an increase of hemoglobin, enhancement of the amount of phosphorus and calcium appropriated and consequent restoration of the nervous system, diminution of secretory activity, lowering of blood pressure, balancing of metabolism, revival of force, rehabilitation of the tissues, freshening of the facial lineaments, supression of nervous insomnia and of the element of pain, return of appetite and good digestion, regeneration of sexual libido in men as well as women, in a word perfect euphoria. Such are the physiological effects ascribed by the unanimous consent of observers to the ultraviolet ray. Tixier justly adds that actinotherapy properly administered is an important adjuvant to drug effect—a truth I have often corroborated when, following my usual custom, I have joined with my other treatment the administration of calomel, diuretics, and general depuratives.

In my daily clinical observations I have particularly noted the awakening of muscular and nervous activity, the arousing of the harmonious forces of energy and robust health, whenever I have found myself in contact with weakness, atony, and physiological incapacity, and this, whatever might be the determining cause of the decline, whether hereditary or diathetic debility, or even the decrepitude of senescence. I am continually rendering assistance in the restoration and readjustment of defensive force, in increasing the vital resistance of the enfeebled.

I apply ultraviolet in all painful and deforming manifestations of subacute or chronic polyarticular rheumatism, by its means bringing about the resolution of exudate, the progressive disappearance of nodosities and malformations. Even in gonococcal arthritis and articular gout these results follow, although a little less pronounced and perhaps longer delayed. In several cases of fracture, costal, clavicular, or radial, I have observed a very evident consolidating effect under the

influence of the rays. Topoalgic pain, neuralgia, neuritis, chronic zona, spasms and contractures are greatly ameliorated. I have also noted in my series of observations the cure of chronic adnexitis with leucorrhea, of hay fever, and the dissipation of the well known deposits of fat in the breasts and on the hips which women acquire after childbirth or at the fateful period of the menopause.

Ultraviolet ray energy increases uteroövarian vitality amazingly in poorly developed young girls, causes their mammary glands to grow, and firmly establishes the absent or atonic menstrual function. Has any one the right, asks Aimé, "to deprive himself of such a therapeutic resource?" Hypoplasia of the female genital organs, and of the male organs as well, the amenorrhea and dysmenorrhea of puberty, juvenile menorrhagia and metrorrhagia are subject to this simple treatment. J. L. Pech even declares in the Presse Médicale of May 21, 1924, that many women can be rendered fertile by ultraviolet whose sterility is due neither to malformation nor to any discoverable ovarian lesion, notwithstanding they have been consigned to irremediable childlessness. A valuable remedy, surely, for the conceptional insufficiency of the race and the dangers of a reduced birth rate!

In chronic metritis with a thick, offensive discharge and constant pelvic pain, a definite cure can be effected by the violet rays, although it may have proved resistant to injections, suppositories, antiseptic applications, the caustic pencil, and even curettage. And this without exposure to radiodermatitis, internal burns, atresia, or perforation, as is the case with other current methods. The cure is brought about gently through elimination of the microörganisms, gradual removel of purulent accretions, and suppression of septic exudate; in a word, there takes place a physiological disinfection of the uterine mucosa by expelling the secretions and then calling in the kindly phagocytes. Upon this integral restitution takes place without superfluous tissue. Without making ultravoilet a panacea, as the Germans do, in uterine pathology and a heroic remedy in sterility, we may well recognize its selective and invariably favorable influence on the uteroövarian mucosa and the organs of the true pelvis. It is the task of other physiotherapeutic agencies used in gynecology to supplement this influence. I wish to avoid constant repetition: but why be content to limit one's range and exclude means advantageous to combine for the great good of the patient and the more rapid and complete success of the practitioner?

The indubitable utility of ultraviolet in tubercular affections depends chiefly on its bacteriophage value. Localized tuberculosis in such forms as arthritic white swelling, osteopathic conditions, and the torpid tuberculous ulcers of lupus are those which especially call for the topical application of light. Thus, I have seen an anal fistula healed which followed the opening of a tubercular anorectal abscess. General irradiation may be used with success in pulmonary and pleural tuberculosis, in the laryngeal phthisis, in tracheobronchial adenopathy, in bacillary infection of the testicles, intestines, peritoneum, kidneys, or other organs. I advise invariably the combination of physiotherapeutic, dietetic, and pharmacological measures for the purpose of promoting oxidation, effecting molecular massage of the cells, increasing the vitality and proliferation of anatomical elements, and reëducating pulmonary function, the latter by means of ozonized balsamic inhalations. But the energy of the violet ray, that astonishing source of exceedingly rapid undulatory vibrations, is applicable to every case of incipient tuberculosis, convalescence from measles or whooping cough, anemia, chlorosis, leukemia, neurasthenia, lymphatism, scrofula, initiated by deficiency of lime and therefore responsive, like rickets, to cretaceous medication.

I have seen the ulcerations of laryngeal phthisis brought to cicatrize in three or four weeks by the ultraviolet ray: when they are refractory to this treatment, an improvement at least in the symptom of "dysphagia" is always observed. We are acquainted with the biotic effect of the sun on animal hemoglobin, which seizes, absorbs, and incorporates the ultraviolet rays, just as does the chlorophyll of vegetation. Very well, but the ultraviolet of the quartz lamp has a superior effect. Nevertheless it is always well to combine with the actinic ray high frequency and röntgentherapy, a method advised by Saidman, Gaudier, and others, and by Achard in tubercular peritonitis.

In pediatric practice in particular ultraviolet constitutes a method of choice. Marfan, Lesné, and de Gennes call attention to the regulation of phosphocalcic metabolism in flaccid, rachitic children, unable to walk and even to sit up. "Superior as a preventive and curative agent to all the codliver oil in the world," as Woringer says, irradiation is applicable to every athreptic and cachectic child, to the feeble, the premature, the heredotuberculous and heredosyphilitic, the pitiable victims of bottle feeding, and all hypotrophic infants, even those afflicted with marked craniotabes, as well as all suffering from malacic and osteoporous processes. At a later age the scrofulotuberculous, those with thyroid obesity, with infantile paralysis, with enuresis, with adrenal insufficiency, with adenoids, with chronic infection of the digestive canal, those convalescing from eruptive fevers, those weakened by too rapid growth, all these and others may benefit by ultraviolet treatment, with the addition in some of infrared, which will stimulate and regenerate the endocrines.

In every instance where the indication is to remedy lack of sunlight and mineral instability in childhood ultraviolet shows its favorable effect; first, in radiographs, which testify to the gradual assimilation of phosphorus and calcium, to the progressive improvement of osteoarticular nutrition; and second on blood examination, which reveals effective cytolysis and proliferation of hematoblasts, probably caused by local action of the rays on bone marrow. Thus ultraviolet stands out in the front rank in the conflict with rachitis and in the conservative treatment of surgical tuberculosis—peritonitis, the ascitic form especially, cervical adenopathy, cutaneous bacillosis in the form of lupus.

By stabilizing basal metabolism and cerebrospinal phosphogenesis, as well as by improving the internal secretions, ultraviolet also exercises a highly favorable influence on the nervous system. This may be observed in cases of convulsions, of glottic spasm, of paroxysmal apnea, of tetanic contractures of the extremities. All these syndromes of neuropathic irritability or of spasmophilia are affected in a way which may be called heroic, since, as Rohmer says, the severest cases of this class of pathology are rayed always "with uniformity and with certainty."

Ultraviolet reaches even the mental sphere. Fretful infants, unmanageable children are seen to become cheerful and pacific: their disposition improves, their intelligence develops. Mondie and Boyd have reported encouraging results obtained in this way in the course of such mental states as hebephrenia and juvenile melancholia. The ill defined disturbances of vagotonia and sympathicotonia, poly glandular insufficiency,

myxedema, and Basedow's disease also find in actinotherapy an excellent medium of remission and amelioration.

Lupus will serve here by way of transition to the study of the treatment of dermatosis by ultraviolet.

In 1898, when Finsen introduced his method of treatment by means of the actinic rays from the lamp so happily invented by him, he drew attention to the necessity of bringing lupoid tissue to a point of certainty as to the complete destruction of the nodules where the bacillary germs are fond of hiding. To accomplish this, it is necessary always to act with wise deliberateness, interrupting the treatment from time to time to await the disappearance of swellings and congestion which too often mask the lesion at the diseased spot. It is possible in this way to escape recurrences and disagreeable sequelae, and to obtain cicatrices which are solid and as esthetic as possible.

Care must always be taken in administering the rays to avoid placing the patient near a metallic body or a wall coated with mixed glue and oil, which might receive the rays direct from the lamp (Pech). To localize the irradiation as much as possible the healthy tissues should be protected by covering them with vaseline impregnated with burnt resin. The coating will prevent dermatitis and telangiectases. The patient is placed on a white couch and the lamp set a yard away from the surface to be treated, its rays striking that surface vertically in as large quantity as possible. The number and duration of treatments vary according to the individual case. Generally a sitting of an hour is given every three days. The eyes are protected by spectacles of dark Fieuzal, the face and neck preserved from photodermatitis or electrical sunstroke and from pigmentation by means of white compresses.

I advise alternating ultraviolet with local high frequency, with diathermic coagulation, and even sometimes with electrolysis, in order to modify the lupus tissue profoundly and render it still more uninhabitable to bacilli. The microörganisms undergo such a cooking by diathermia as is capable of destroying them forever. Following irradiation of the lesions giant cells and neoplastic epithelium are seen to be destroyed and come away in a sort of exudative lymphorrhea, which releases immunizing and sensitizing toxalbumins for vital defense.

Brettmon recognizes three degrees of irradiation: (1) oxidation, evidenced by pigmentation, erythema, vascular dilation, and tissue repair without exfoliation; (2) exfoliation, followed by edema of the papillary layer of the skin, by intense diapedesis, and microscopic vesiculation; (3) phylctenulation, with destruction of the horny layer, disappearance of edema and crusts, cellular karyokinesis, drainage and disinfection by lymphorrhea. The same processes are seen in all skin lesions produced by ultraviolet. The intensity and duration of irradiation are determined and the activity of the cold light sensitized according to the degree of reaction desired and the results it is sought to obtain.

On wounds ultraviolet has a healing effect most beneficent. To it certainly is due the gratifying result which I have often seen come from the high frequency effluve: active drainage of serious collections from the interior to the periphery, production of a typical breaking open, discharge of polynuclear neutrophile leucocytes (Leriche and Policard), such are the intimate effects of ultraviolet on wounds. On increasing the intensity of diffusion on the part of the rays, certain substances added by way of treatment act as chemical sensitizers, especially eosin, rythrosin, and methylene blue.

The most resistant skin conditions, psoriasis, nevi, chancroids, torpid ulcers, atrocious anovulvar pruritus, pyodermatitis, infected eczema, furunculosis, anthrax (ultraviolet destroys the streptococci and staphylococci), acneic dermatosis, seborrhea are cured without the need of dreading the treacherous radiodermatitis of röntgentherapy. Even more, ultraviolet very quickly subdues radiodermatitis. (1) When I first called attention to its treatment by the high frequency effluve, I quite rightly attributed the major part to actinotherapy. It is the most physiological of all the applications and also the most healing.

It should be observed here that mucous surfaces bear the irritation of the photo-reaction far better than the skin. This should be taken into account in dealing with pharyngitis, amygdalitis, sinusitis, trachoma, blepharitis, conjunctivitis, keratitis, suppurative otitis, and similar inflammations. Ultraviolet enhances ocular and auditory acuteness.

In the treatment of seborrhea of the scalp Bizard is not afraid to place the burner for twenty minutes at thirty centimetres distance from the region affected. In this way he obtains a strong erythematous and even a phlyctenular reaction, but without dangerous consequences, for the application may be repeated in ten days with great benefit to the patient.

(1) Dr. Ménard, a radiologist of Cochin, was cured by ultraviolet of deep seated lesions. Since 1903 I had predicted the prevention and cure of radiodermatitis by the high frequency effluve charged with ultraviolet.

Open alopecia, pityriasis, vitiligo, psoriasis, acne rosacea, lupus, erythematosus, prurigo, and lichen, as well as keloid may all be treated routinely by a quarter of an hour's irradiation at twenty centimetres distance. But in the treatment of nevi, lupus, chancroids, and other deep and severe skin affections it is necessary to effect a contact or even local compression by the lens or by its chamber. In this way I have sought and obtained the resolution of hypertrophy and final keratoplastic epidermization in many cases of rhinaphyma. In these cases it is requisite to persevere until pigment accumulates, the natural sensitizer, according to Rollier, which enables the skin to assimilate the rays and convey them away to be transmuted into other forms of energy. Ultraviolet pigment is a means of defense and of radiolytic immunization, besides being a dependable analgesic, a hemostatic, and a positive decongestive, although with activity less pronounced than that of the x-ray. Humphris has observed this effect in hyperemic conditions of the liver, incipient cirrhosis and certain forms of pain and dyspepsia, especially where there is hyperchlorhydria. Ultraviolet analgesia Foveau suggests applying for the efficient aid of dentistry against pain from any source. It is even used in America to cleanse the teeth, but with the aid of oxygenated water, we are told. It is advised, finally in orchitis, prostatitis, ozena, peritonitis, and chronic pleurisy, where the cure is effected by inducing sclerosis. In diabetics, lastly, it seems to increase the tolerance for carbohydrates.

Daily sittings of a half hour need not be feared when a fistulous tract is under treatment or an operation wound whose closing is protracted and difficult. Furthermore, the application of the rays is always very agreeable. As for securing toleration, this is chiefly a question of practice and experience, as in all physiotherapeutic effects. However, it is not the most penetrating rays which seem most beneficial. This is why pigmentation, which restricts radiant penetration, is always followed by an effective curative reaction by

reason of the metatrophic exchange it sets up in the skin at the surface.

In the fourfold synthesis wrought by ultraviolet Berthelot sees the only plausible hypothesis to explain the appearance of life on our globe. It is certain that the rays, in their chemical property of condensation, approach amazingly near to vital activity. The photolytic disintegration they effect places them in unquestionable analogy with the ferments.

As respects the healing art, ultraviolet seems to me the only indispensable complement of contemporary medicine and surgery. Childhood in especial is freed by it from terrible suffering. It remineralizes the blood and renews its hemoglobin, repairs the bones, increases the vital energy of the neurons, corrects nutritional perversion and the most inextricable diathetic conditions; by means of ultraviolet the child regains its unconscious vitality. Two great evils are avoided by its therapeutic use, the exposure of closed tubercular foci and harmful immobilization in plaster.

The antirachitic, resolvent, and sclerosing efficacy of actinotherapy assures a rational puericulture and prophylaxis to city children in nurseries, hospitals, and even schools and families. Furthermore, by its use we shall save "the seed" threatened by all those "obscure diseases," rickets, scrofulotuberculosis, heredosyphilis, spasmophilia. We shall compensate henceforth that deprivation of the factor of light which disposes to chlorosis, to pulmonary vulnerability, to receptivity for infection by the various microbes banded together in darkness to carry on their nefarious work in the small and feeble.

As Saidman says, "we may believe without exclusive optimism that in actinotherapy a new horizon has already arisen." And, recent as it is, the therapeutic aspect of this method is already very broad.

Pilling has recently suggested the ingestion of eosin to reinforce and sensitize the effect of the rays of the mercury vapor lamp, so as to shorten the time of irradiation and render the treatment less expensive. In March, 1925, Nogier and Policard presented to the Medical Society of Lyons the invisible radiance from the extraneous light of wood (ultraviolet freed from all visible luminosity by filtration with glass made of pure nickel oxide) as an extremely accurate instrumentality and capable of effecting biological differentiation. Duhem and Jean Quivy have been endeavoring to measure the ultraviolet rays, a step which would advance physiotherapeutists to a method of practice far more rigorous and more scientific.

"The One Who Walks With Grace and Poise"

By Dorothea M. Beck

ODE TO POSTURE*

Good posture is an asset
Which very few possess.
Sad to relate the favored ones
Seem to be growing less.

We see the folks around us
All slumped down in a heap
And the way that people navigate
Is enough to make you weep,

Some elevate their shoulders,
Some hollow in their backs,
Some stiffen up their muscles,
And some just plain relax.

The one who walks with grace and poise
Is a spectacle so rare
That even down on gay Broadway
The people turn and stare.

If you would cut a figure
In business, sport or school,
Just mind the posture precepts
Obey the posture rule.

Don't thrust your head out turtlewise
Don't hunch your shoulders so—
Don't sag and drag yourself around
No style to that, you know.

Get uplift in your bearing
And strength and spring and vim.
No matter what your worries
To slouch won't alter them.

Just square your shoulders to the world,
You're not the sort to quit.
"It isn't the load that breaks us down;
It's the way we carry it."

Such a rare bit of nonsense verse, delightfully illustrated is a mighty sermon when posted on the wall of the gymnasium. Philosophical patients chuckle, but copy it to send to rector or physician for the "uplift" of the last verse is undeniable. Children laugh at its odd little line drawings and try hard to walk with "grace and poise"; and it is an ever handy catch word for the instructor.

How many feet there are in this world and in how many conditions they come for correction! If we look at the delicate structure so mechanically perfect for its purpose we can see how abuse can distort the fine arches or the flexible toes. Twenty-six small bones, held by small ligaments and intrinsic muscles, carrying the body's weight at each step, have a large task. Together, inner borders touching they form the base of a pedestal, apart they are half a base with the vulnerable point along the arch of the inner border. The height of this (with the astragalus as the keystone) bears the direct downward skeletal pressure but is protected by muscle balance which diverts that pressure or weight to the outer portion of the foot designed by provident nature to sustain it. It is the muscle balance or control instantly distributing weight and shock which makes the so-called "flexible foot" and not flexibility in the intrinsic foot joints themselves. They normally are marvelously firm and it is distortion of these joints which puts undue pressure or strain on ligaments, small muscles, blood vessels and nerves and starts "foot trouble."

The feet which are referred by the orthopedist for physical therapy treatment are variously disabled, running all the way from the "strained foot" of apparently normal appearance but painful nerves, thru the "pronated weak feet" to the "pronated flat feet" which are unequivocally flat. The first has little to mark it as a painful foot: the longitudinal arch may be well defined, the transverse arch unmarred by callous, metatarsal-phalangeal joints in normal alignment, no edema under the external mallaolus and the line of the Tendo Achilles straight on the os calcis. Muscle spasm is very likely to be presented upon certain movements and pain and tenderness on pressure so severe (most frequently in the region of the sustentaculum tali) that it is wiser to guess at its site than to search for it. The second class shows definite changes in anatomical relations: the internal maleoli lean toward each other in sisterly affection, the scaphoid is often markedly prominent having rotated downward allowing the longitudinal arch to sag; the Tendo Achilles swings outward showing how the os calcis has been deflected and is often shortened so that a dorsal flexion of 85° is not possible; the tone of the intrinsic muscles as well as the long muscles of the lower leg is poor; muscle spasm, pain and tenderness on pressure are not necessarily present but the general circulation is more often impaired than not. The third picture is a repetition of the second developed to a greater degree. Here the longitudinal arch is definitely down though muscle tone it not always poor in the sense of flaccidity but may be rigid or "stringy."

The dropping of the transverse arch, "depressed transverse arch," may accompany these conditions or may exist alone as the penalty of a high longitudinal arch. The ball of the foot has taken the brunt of the patient's weight so that she is walking on the heads of the metatarsals; the tendons of the Extensor Communis Digitorum are taut under the skin, the toes are extended upon the metatarsals and flexed upon themselves and the Gastrocnemius is contracted. The intrinsic muscles are more or less inflexible, but when rigid and accompanied by contraction of the plantar fascia "claw foot" is the common name. Though exaggerated forms of any or all of these conditions are often the result of poliomyelitis we are not now concerned with pathological changes.

The physical therapy modalities which have been found efficacious are whirl-pool bath, contrast bath, radiant heat, diathermy, positive galvanism, massage and exercise. The last modality is primarily given for muscle control, re-education and mental stimulus; the others for the sedative effect (particularly true of the whirlpool bath and galvanism for strained foot) and the

*The above ode, by Miss Lilliam C. Drew, may be obtained from the American Posture League, 1 Madison Ave. N. Y. C., in a most attractive form for a wall poster.

benefits derived from improved circulation. The aerated whirl-pool bath will be found comfortable about 110°—115° F. though it is started below 100° F. The warmth and bubbles of air lessen nerve irritability and massage of a strained foot becomes possible after a ten to twenty minute treatment. In this massage, or in any foot treatment, it is important to include the leg as a whole for the tone of the long muscles influences the local condition. The application of radiant heat or diathermy considers this principle and both are given until the lower leg is well heated. Massage and manipulation follow as the second step, the strength of these depending upon the sensitiveness of the nerves and the condition of the muscles.

Exercises are started in moderation as it is as unwise to exceed here as in any other treatment. If the condition is severe they stop with the passive anatomcial movemnts of the foot and toes, otherwise the simpler ones are given increasing at each visit (normally) in time, strength and call for muscle control. For clarity some of the most useful are listed below.

1—Corrected sitting, standing and walking. The feet are held in as near the correct anatomical position as possible.

2—"Sand scooping." Patient sitting with thighs supported, hips and knees at right angles, feet parallel on floor, knees in straight line with heel. Adduction and inversion of foot (heels and knees stationary) dragging outer border of foot for resistance along the floor. Effortless return to correct position.

3—"Foot arching" or "bridge building." Patient sitting as before but with feet slightly "toed in." Lift arch of foot using intrinsic muscles as well as the Anterior Tibial keeping toes and heels on floor. Easy relaxation and return to first position. Interest may be added to this for a child by having her crush a towel under her feet. This necessitates strong action of the toes and alternate control of each foot.

4—"Outward rolling." Standing in correct position inner border of foot is strongly lifted by action of Anterior and Posterior Tibial and intrinsic muscles exaggerating normal arch of foot, toes kept down or flexed. Slow return to correct position. Too great inversion tends to strain the ankle and stretch the Peroneii and care must be taken that the return does not allow the foot to drop beyond the correct position into its old bad habit of posture.

5—"Over corrected walking." A static exercise in which the over-corrected position of No. 4 is held while the patient walks around the room. It often forms an excellent beginning exercise for a fairly well muscled foot as its very exaggeration makes a mental impression but it is wise to introduce and substitute the following as soon as possible.

6—"One-two step." A dynamic walking exercise which is a combination of No. 1 and No. 2. Children often get apparent inversion by inward rotation from the hip joint so until it is a pure foot movement let them walk with knees slightly flexed and steadied by their own hands to "keep them out" thus localizing the correct muscle action.

7—"One-two step with toe gripping." Five steps of No. 6, feet brought parallel on sixth count lifted to an over corrected position and held there while the toes are strongly flexed and relaxed five times. Care must be taken that the relaxation does not deteriorate into extension as this is harmful when a depressed transverse arch is a complication.

8—"Cock walk." Feet in correct position, hands grasping ankles, patient walks about room keeping knees straight. With a shortened Gastrocnemius this is an almost impossible "stunt," but appeals strongly to the game spirit.

9—"Uncle Wiggley." A slow balance walk of six counts:

(1) Step forward with left foot a normal pace with heel only. Stretching of the Gastrocnemius should be emphasized here.
(2) Whole foot on floor in correct position.
(3) Strong inversion taking care to keep toes straight so that they get the maximum of their normal pressing or gripping against the floor to maintain balance.
(4) Transfer weight of body to left foot. This is a splendid opportunity for general body alignment and poise.
(5) Keeping left heel on floor, on floor bend knees keeping them pressed outward to fullest extent. Trunk must be erect, weight forward on left foot and hips straight with the line of progression.
(6) Stretch knees so that position is that of (4). Repeat, stepping forward with right foot while the left still remains in over-corrected position. One must be careful that the steps are taken in parallel lines about six inches apart as the tendency is to progress in a cross-legged manner.

10—"Skipping." The mind and muscles must work quickly to keep bad foot habits from appearing. Emphasis is placed upon this correction as well as upon lightness and quietness.

A few strokes of effleurage and a dash of rubbing alcohol follow the exercise program as "desert."

Space will not allow further description of, for instance, the old stand-by "tendon stretching against stall bars" or heel raising. The latter has been omitted purposely as its tendency is to further contract the Gastrocnemius and depress the transverse arch. If used a tendon stretching and toe griping should immediately follow. Toe grippings should also be used cautiously as it is difficult to localize the action in the metatarsal-phalangeal joints.

"Uncle Wiggley" and "Skipping" are two exercises designed to carry over into large muscle group control and shifting weight the correct foot posture endeavoring to get away from rigidity and over correction. This carrying over into life outside of the gymnasium is the most difficult task of all and here shoes play an important part. When there is a definite anatomical or pathological disturbance the patient cooperates readily with the doctor's prescription of anatomical shoes. Often however when the condition is one of habit only the shoe question is relegated to the physical therapy regimen. With children the solution is easy but with adults and the in-betweens moderation is all that one should expect. It is granted that a corrective shoe will be absolutely ignored by the fashion of today so compromise is in order. The stressing of sport togs and the recommendation of a sport oxford with a moderate heel, a ghillie brogue or even espadrilles or sneakers in summer is often a solution. Sneakers and espadrilles give marvelous opportunity for foot re-education if muscle control is guided in the way it should go but by the same token they afford marvelous opportunity for increased bad habits if that control is lacking. Would that it were possible to fasten a thumb tack or a pebble in a strategic spot so that when a lazy brain allows the foot to pronate a reminder is ever present!

No re-education can be accomplished in a week or

two and infinite patience, perception and inspiration must be called upon to train erring feet. It is all worth while, however, when a youngster whose navigation used to make one weep now walks with grace and poise down gay Broadway.

Montclair, New Jersey.

REFERENCES

Ellis, Thomas E.: The Human Foot. J. & A. Churchill, London, 1889.

Drew, Lillian Curtis: Individual Gymnastics. Lea and Fibiger, Philadelphia and New York, 1922.

Skarstrom, William, M. D.: Gymnastic Kinesiology. American Physical Education Association, Springfield, Mass., 1913.

Bowen, Wilbur Pardon, M. S.: Applied Anatomy and Kinesiology. Edited by R. Tait McKenzie, G. A., M. D., M. P. E., Lea and Febige, Philadelphia and New York, 1919.

Mackenzie, William Colin, M. D.: The Action of Muscles. Paul B. Hoeber, N. Y., 1921.

Bradford, Edward H., M. D., and Lovett, Robert W., M. D.: Orthopedic Surgery. William Wood & Co., New York, 1921.

Granger, Frank Butler, A. B., M. D.: Physical Therapeutic Technic. W. B. Saunders Company, Philadelphia, 1929.

OFFICIAL PIN

The *Official Pin* is now ready. Get your purchase card from the treasurer and send to Filene's Sons Co., Boston, Mass. Price $3.00. The pin is small and made up in blue and gold and the same design as in the arm emblem—very pretty.

American Physiotherapy Association
Application for Membership

Name.....

Address.....

Present Occupation.....

Send Application to the Secretary
Charlotte H. Ballard, St. Francis Hospital,
Bush and Hyde Sts., San Francisco, Calif.

Officers and Executive Committee of the American Physiotherapy Association, 1929-30

President
HAZEL E. FURSCOTT.....Fitzhugh Building, San Francisco, Calif.

Vice-Presidents
BEULAH RADER....U. S. Marine Hospital 19, San Francisco, Calif.
SARA E. KOLLMAN.....Gillette State Hospital, St. Paul, Minn.

Secretary
CHARLOTTE H. BALLARD.....
.....2325 Twelfth Ave., San Francisco, California

Treasurer
FLORENCE C. BURRELL.....230 Grand Ave., Oakland, Calif.

Members-at-large
WINEFRED TOUGAS....9 Bellingham Rd., Newton Highlands, Mass.
HELEN KAISER.....1817 East 87th St., Cleveland, Ohio

Director Bureau of Appointments
C. GRACE COURTER.....233 East 17th St., New York City

Chairman, Committee on Education and Publicity
MARGUERITE I. IRVINE.....1011 Summit Ave., Seattle., Wash.

Chairman, Legislative Committee
MATHEA BOXETH.....
.....Physiotherapy Department Medical Center, New York City

Advisory Committee
DR. RAY LYMAN WILBUR DR. LANGLY PORTER
DR. HOWARD MARKEL

EDITORIALS

The Spiritual in Physiotherapy

Can we individually, on looking back to the beginning of our interest in psysiotherapy recall any one incident which seemed to open the way? Was it not a gradual outgrowth of interest in serving others as we found ourselves a part of the great social scheme of just living? Any real calling to be of good should be the natural result of many experiences.

The too sudden inspiration so often promoted by extreme emotion flares up like a bonfire fanned by a breeze only to die out with its last tiny spark. The fire well laid of both twigs and logs, fed constantly from a store of good material, guarded from sudden gusts of wind, burns steadily, giving out both heat and light and under continued care may burn a century.

Let us be moderate and steadfast in our desire to serve; ready to undertake the new but keeping in touch with the old; eager to blaze the trail but following compass and Guide. We may often grow discouraged with the failure to produce spectacular results. Our path may lead us through a monotonous routine of apparently little worth. With an earnest desire to help human suffering let us bear in mind the far reaching influence we may exert upon others through a keener understanding of the inner being. Search for something deeper than human flesh and know more than muscle and bone. A timid nature will lose its fear and a discouraged nature will find strength to meet physical pain. E. M.

Copy of Petition Presented to the State Board of Medicine, Boston, Mass.

Feb. 9, 1926.

Petition to the Massachusetts Legislature for the enactment of a law which will create a new department to regulate these branches of therapeutics which come within the definition of physiotherapy. These branches of physiotherapy, namely, therapeutic massage, therapeutic exercise, hydrotherapy, electrotherapy, and mechanotherapy.

All matters pertaining to the examination and registration of practitioners of physiotherapy to be administered by the State Board of Registration in Medicine.

All members of the Massachusetts P. T. Association and other qualified physiotherapists to be exempted from examination and to be registered, providing they make application for same before a certain date (to be fixed).

The relation covering the practice of trained nursery is suggested as a basis to work from in framing the new law. This is suggested as a means for providing that physiotherapy be understood to signify a group of practices which are adjuncts to medicine and surgery and not to be classed as a separate or complete system of therapeutics.

The letters P. T. or the title physiotherapist to be used only by those practitioners who are registered by the State Board of Medicine.

The department of the State Board which is to regulate the practice of physiotherapy should have a physiotherapist appointed by the Massachusetts Association of physiotherapy included in its personnel. The appointee to serve for a term of years.

Outline of a definite standard to be used as a prerequisite for persons making application for examination to the department of physiotherapy.

The report made by a special committee of the Massachusetts Physiotherapy Association to look into the matter of state license to be issued to persons practicing physiotherapy in the state of Massachusetts.

This committee drew up a letter which outlined the objects of the Massachusetts Physiotherapy Association as stated in its constitution, and this letter was sent to Dr. Sylvester, chairman of the Massachusetts State Board of Medicine.

Dr. Sylvester was in favor of the measures being taken in order that physiotherapy practitioners should come under the State Board of Medicine, and that licenses be issued to persons of good standing providing they meet the necessary requirements.

Dr. Vaughan, the secretary of the State Board of Medicine, was approached, and it was decided that the committee attend the hearing of a bill to be read before the committee on public health at the state house on Feb. 9, 1926.

This bill was to place the licensing of manicurists and masseurs and establishments for the giving of vapor baths under the jurisdiction of the State Board of Medicine.

It appears that all practices of medicine outside the range of registered physicians and surgeons, registered osteopaths, and registered nurses come under the classification of drugless healing. It was definitely stated by the chairman of the board that no special bill could go before the legislature to include only physiotherapists, our plea could only be presented as one of the various branches of drugless healing and be classified with them.

Dr. Burrage, president of the Massachusetts Medical Society, was interviewed, but he said although he was interested in our problem, the Massachusetts State Medical Society would be unable to be of practical service to us in the way of including us as a technical specialty because women had never been able to break through the rites and ritual of the Massachusetts State Medical Society.

A hearing of a bill to place licensing of manicurists and masseurs and establishments for the giving of vapor baths under the jurisdiction of the State Board of Medicine was read, and it was under this bill that physiotherapy was listed on Feb. 9, 1926.

Hundreds of drugless healers and culturists of every order and nationality were present at the hearing of this bill. All the drugless healers present were against being placed under the State Board of Medicine for the purpose of the granting of state licensure with the exception of the lone representative of the Massachusetts Physiotherapy Association.

Needless to say, the bill did not pass. In order to retain our self respect and maintain the scientific and ethical standing that we have always tried to hold, the Massachusetts Physiotherapy Association felt it was better to go without state license than to be classed with this group of cultists and drugless healers.

Report of Section No. 4 of the National Legislative Committee

This section comprises Delaware, Maryland, New Jersey and New York, and in November, when it was formed, there was only one local chapter, New York. Members-at-large in each of the other states were asked to obtain as much information as possible from their state medical societies and from the laws of the state governing the Medical Practice Act. In every instance, with the exception of New York, there were no specific requirements for physical therapy and if it was mentioned at all it was included under the heading of all sorts of "paths" and "cults."

New York has a clause permitting the licensing of persons to practice physiotherapy "upon evidence that the applicant has satisfactorily completed an approved four-year secondary school course of study or the equivalent as determined by the commissioner and thereafter studied physiotherapy not less than four years in a school maintaining a satisfactory standard." At the time this law was passed there was no course of four years in the state so that the law defeated itself.

Both Delaware and Maryland are minus any legislation touching the subject but "the powers that be" thought it could be covered by the same rules governing "neuropaths" and such like.

As there were quite a number of members of the A. P. A. living in New Jersey they decided to unite and form a Chapter mainly for the purpose of influencing legislation and registration which really amount to the same thing, for if the laws regulating registration are not satisfactory it is not well to be registered until they are.

In New Jersey it is hoped that physical therapy be considered one-third of the trinity of medicine-surgery-physical therapy. It is felt that if a measure could be formed to include these three rather than a separate license for physical therapy then all the members of the A. P. A. would gladly be licensed and registered and proudly carry the letters "R. P. T." at the end of their names as the nurse does her "R. N." According to the mind of the individual the letters could stand for "Registered Physio-Therapist" or "Registered Physicaltherapy Technician."

The legislative committee met with its advisory committee and as a result many letters were written to medical socities and councils asking for advice and cooperation. It was suggested that in each county medical society some member of the Association or some friend in the society present the subject of the A. P. A. and its aims and ideal for a standardized, registered group of workers and thus prepare the soil for future legislation.

So far little of real worth has been accomplished but the ball has started rolling and the real results will come from the concerted efforts of the national legislative committee.

Respectfully submitted,
EMILY J. GRIFFIN,
Chairman Section No. 4,
Legislative Committee.

Program for the Ninth Annual Convention of the American Physiotherapy Association, Fort Shelby Hotel, Detroit, Mich.

MONDAY, JUNE 23.

4—6 P. M.	Registration tea.
8 P. M.	Address of welcome, Dr. Carl Buck; "Teaching of Physical Therapy," Dr. Willis S. Peck; "Electro-physics," Dr. K. W. Stenstrom; "Correlation of Physio and Occupational Therapy" (film), Miss Mildred Elson.

TUESDAY, JUNE 24.

9 A. M.	Business session.
12	Officers' conference and luncheon.
2 P. M.	Clinic Henry Ford Hospital. "Poliomyelitis and Its After Care by Means of Exercise in Water," Dr. Leroy Hubbard; "Fractures," Dr. F. C. Kidner; "Exercises for Scoliosis," Dr. Custis Lee Hall.
8 P. M.	"Spastic Paralysis," Dr. Charles Peabody; "Thermotherapy," Dr. John S. Coulter; "Hydrotherapy at Battle Creek" (slides), Miss Leone Sweet.

WEDNESDAY, JUNE 25.

9 A. M.	Business session. Legislative and educational business.
12:30 P. M.	Visit to Ford Museum, Dearborn.
3 P. M.	Clinic at Ann Arbor, University Hospital. "Bone and Joint Tuberculosis," Dr. Vernon L. Hart; "After Care of Poliomyelitis," Miss Alice Plastridge. Tea to be served at University Hospital.
Evening	Trip through Bloomfield Hills. Dinner at Fox and Hounds Inn.

THURSDAY, JUNE, 25.

9 A. M.	Business session. Election of officers.
2 P. M.	"Hydrotherapy at St. Elizabeth's Hospital," Dr. W. M. Kenna; "Physical Therapy for the Painful Shoulder," Dr. Norman E. Titus; "Pott's Disease," Dr. John T. Hodgen; "Scoliosis," Dr. Arthur Steindler.
7:30 P. M.	Banquet.

All meetings will be held at Fort Shelby Hotel except the clinic at Ann Arbor and the clinic at Ford Hospital. Come one, come all! Time is running short and enthusiasm high!

Half rate fares are available. The ticket must be signed by the local station agent and countersigned by the A. M. A. officer.

Hotel reservations are still available at various hotels for $2.50 and $3.00. The Fort Shelby offers all outside rooms with bath for the above rates.

I think we may congratulate ourselves that we have

been able to add the name of Dr. Steindler to our list of speakers. We also have the promise of illustrated lectures by two of our members.

The trip to Ann Arbor will include some real treats. Stops will be made at the Ford Museum and Old Village as well as a trip around Michigan's Campus.

As those who have had the privilege of attending former conventions will testify, "If you are not among those present you will regret it all the rest of your life."

PROGRAM OF COUNCIL OF PHYSICAL THERAPY OF A. M. A. IN WHICH MEMBERS OF A. P. A. TAKE PART

MONDAY, JUNE 23.

10—11 A. M.	"Therapeutic Exercise," by Dillehunt.
11—12 A. M.	Demonstration, by J. S. Coulter, M. D. and Miss Morrison.
1—3 P. M.	"Massage—Its Effects and Indications," J. S. Coulter, M. D. and Miss Beard.
3—4 P. M.	"Muscle Re-education," by Osgood.
4—5 P. M.	Demonstration, by J. S. Coulter, M. D. and Miss Plastridge.

WEDNESDAY, JUNE 25.

2 P. M.	"Correlation of Physio and Occupational Therapy" (film), Miss Mildred Elson.

Council meetings to be held at Masonic Temple.

Members attending convention in Detroit in the near future will be meeting old friends—old friends in person and old friends in debate. We shall greet this year as previously that ever present question "What's in a name?" We have grown old in debate but have never yet worn out the subject.

"American Physiotherapy Association" implies the SCIENCE rather than a group of workers in that science. As such it is beyond the assault of the claims that we are infringing upon a title or field not justly ours.

Let us therefore take the very excellent advice of our many medical friends who say "Stop talking so much about it and keep the name you have had for the past ten years." The incorporation of the various chapters of the A. P. A. has helped to establish that name which in its very brevity and neutrality does not claim for its members any untoward prerogative nor does it mislead the layman as to the status for such members.

The Council on Physical Therapy of the A. M. A. agrees with us (as published in the convention number of the Journal of the A. M. A.) that "physical therapy is not a separate and distinct therapy but a valuable adjunct to proper surgical and medical care." It is in this wide field and with the general surgeon and physician that the mass of our work is done. To them we are valuable assistants with no thought or spectre or a dreaded "ist" to bother their minds. We can be "physiotherapists" or "physiotherapy technicians" or what have you as long as we are there.

For ourselves "R. P. T." seems to fill the long felt want. "R" stands for state registration—a very vital necessity which presupposes the passage of the proper legislation—and "P. T." for physiotherapist (or physiotherapy technician). It is granted that "technician" is often an easier term than "physiotherapist" for the physician to use when speaking of his "right hand man." In many ways the onus of "technician" has been removed as the true worth of the work and worker has been proved.

Our name in its present conception does not interfere with that work. We have in the past served the medical profession with undivided allegiance; we have upheld their hands in the army, in hospital work and in private practice; we have rigorously followed the ethics of our profession and the tenets of our constitution and we shall continue to do so. But we also stand for the true dignity of the SCIENCE of that profession in the American Physiotherapy Association.

Abstracts

By John S. Coulter, M. D., Assistant Professor of Physical Therapy, Northwestern School of Medicine

Physical Equipment of Therapeutic Pools. Charles LeRoy Lowman, M.D., Los Angeles, in Jour. A. M. A., 94:12:845, March 22, 1930.

It can readily be seen that there is just as great a possibility for variation in exercises thus applied as there is in the regular gymnasium, with the added value that in the water the patient can be allowed to move in all planes, whereas, in the gymnasium, in bed or on the table, movements are restricted to certain planes. The successful use, however, of various types of apparatus depends greatly on the resourcefulness of the technician and her knowledge of kinesiology—not only the normal but more especially the pathologic or abnormal kinesiology, as its exists in paralytic patients or those in whom joint plastic surgery or tendon transplantation has been done. The surgeon's understanding of the prescriptive factor in ordering various types of work is also essential for the successful treatment of any given case. A surgeon should not simply place the patient in the hands of a technician and depend on her to get results. The more intelligent the prescription is, and the clearer the comprehension of the technician, the better will be the results.

Finally, then, it can be said that the successful use of hydrogymnastic technic depends on three factors: the surgeon, the technician and the physical equipment and limitations of the pool.

Carbon Arc Light Treatment In Bone and Joint Tuberculosis. By Katharine Pardee, M. D., Baltimore, Md., in Jour. Bone & Joint Surg., xii:2:270, April, 1930.

In his summary this author says:

In the majority of cases the blood counts rose under treatment.

The children tended to gain weight while under treatment.

The favorable effect upon the local tuberculosis lesion was marked.

We believe that our findings show that exposures to the radiations of the high intensity carbon arc light are of value in the treatment of bone and joint tuberculosis, especially during those months of the year when little sunlight is available.

While the value of this form of treatment seems to be well established, many problems connected with its use remain to be solved.

Specificity of Light Action In Tuberculosis. By Winthrop M. Phelps, M. D., New Haven, Conn., Department of Surgery, School of Medicine, Yale University; in Jour. Bone & Joint Surg., xii:2:253, April, 1930.

In his conclusions this author says:

The wave-length band lying between 320 and 380 millimicrons has been studied both clinically and experimentally.

Effects have been obtained which prove this band to be active.

The chief effect is an acceleration of the processes of repair which may or may not be specific for tuberculosis, but which is essential in the retention of function. It is an indirect effect, general rather than local.

Heliotherapy in tuberculosis can be as effectively carried out in sea-level cities as elsewhere.

Longer exposures can be given if the erythema and tan-producing rays, 300 to 320 millimicrons, are of small quantity or absent.

Erythema and tan therefore are of no use as a basis of dosage given.

Dosage should be measured in all sun therapy, and the method of measuring such dosage is outlined.

Artificial sources of light containing the band between 320 and 380 millimicrons and comparatively free from the shorter wave lengths are very useful as sun substitutes.

Tuberculous Lymph Nodes. By Preston A. Wade, New York, in American Jour. Surgery, 8:2:330, February, 1930.

Conservative treatment in the early stages of the disease is the wise procedure. Radical dissection has been given up as a routine procedure in most clinics because of the resultant unsightly scars and the chances of nerve and vein injury, and because of the usefulness of other conservative methods of treatment. Heliotherapy is of great value in the treatment of the lymph node involvement as it is in any other type of tuberculosis. Natural heliotherapy alone in selected sites is sufficient to cure tuberculosis lymphadenopathy but when used in conjunction with other methods is most effective. The quartz lamp is valuable not only for its general effect but also for its local application to the enlarged nodes.

X-ray therapy is probably the most valuable single conservative therapeutic agent in this stage of the disease.

Radium treatment gas shows approximately the same results but its use is more troublesome and more expensive.

Electrical Burns. By Hart Ellis Fisher, M. D., F. A. C. S., Chief Surgeon Chicago Rapid Transit Co., Chicago, in Illinois M. J., 57:3:201, March, 1930.

We have met with successful encouragement of healthy granulations in a number of cases by the judicious use of quartz light therapy. The use of mercurochrome has been discarded on account of the crust formation favoring germ propagation. These patients are very frequently in a greatly reduced state of resistance and a building up of the general health will be productive of granulations which appear as if by magic. Maintenance of the patient in bed until the active stage is passed and then out in the sunshine is a very good tonic for burn cases in children and elderly people.

Physiotherapy, intelligently and scientifically applied, has a very definite part in burn therapy, in the restoration of function to a part. It will aid in reducing contractures and in preventing fibrosis in joints from long periods of disuse. Early massage, active and passive motion and work movements are of value. Never move a part to the point where it is painful to the patient. X-ray has often been used by us to soften scar tissue and reduce keloid formation, with good results.

A Study of Intestinal Tuberculosis Among Ex-Service Men. By Philip B. Matz, M. D., Chief Medical Research Subdivision, Medical Service, U. S. Vet-

eran's Bureau, Washington, D. C., in American Jour. Med. Sc., clxxix:4:532, April, 1930.

The most frequent therapeutic regimens used in the Bureau cases in the treatment of intestinal tuberculosis were: Rest, diet, heliotherapy, both natural and artificial, and medicinal therapy including calcium chlorid.

Of the total number of 849 patients with intestinal tuberculosis approximately 21 per cent were improved and approximately 2 per cent were cured, following hospitalization; the rest of the patients were unimproved or were in a condition of retrogression; 42.4 per cent of the patients died. It is thus seen that treatment is not altogether hopeless, as is commonly believed. Some cases may improve and may even be cured following various therapeutic procedures.

The most frequent sites of the lesions of alimentary tuberculosis, in the order named, were: Cecum, ileum, ascending colon, transverse colon, ileocecal valve, descending colon, jejunum, appendix, duodenum, rectum and sigmoid.

While the majority of cases of intestinal tuberculosis are almost always secondary to pulmonic disease, in a small percentage of cases foci of infection were found in organs other than the lungs.

A review of the statistical data would lead one to state that ultraviolet radiation, either alone or in combination with rest and a dietetic regimen, had a beneficial effect upon intestinal tuberculosis; but it is questionable whether or not it may lead to a cure.

Use of Ultraviolet Rays In Preparation of Infected Granulation for Skin Grafting. Abstract in Jour. A. M. A., 94:15:1177, April 12, 1930, from Surgery, Gynecol. & Obstet., 50:478, February, 1930.

By the methods Gatch and Trusler have employed, Thiersch grafts cut to proper thickness and successfully transplanted give a better result than whole skin grafts. They state that the factors which render granulation tissue unsuited for grafting are cicatrix formation and infection. Exposure to ultraviolet rays is a valuable adjunct in the preparation of granulations. The surface must be beefy red, vascular and free from exudates. Excellent results may be obtained by dressing the grafts under pressure with dry gauze wool and an elastic bandage. For the grafting of small areas which will be subjected to trauma and for flexor folds about joints, thick Thiersch grafts are employed. Joints should be splinted in full extension until all tendency to cicatrization has ceased.

Chronic Recurrent Erysipelas Actinotherapy. Abstract in Jour. A. M. A., 94:16:1274, April 19, 1930, from Strahlentherapie, 35:130, Jan. 9, 1930.

Bohmer gives the clinical histories of ten cases of chronic recurrent erysipelas in which cure was effected by irradiation of the entire body. He emphasizes the importance of a preliminary determination of the sensitivity of the patient's skin to ultraviolet rays and gives an illustrated description of an instrument that he uses for this purpose. The treatment is begun with short weak irradiations whose duration and intensity are gradually increased. The author explains the cures on the basis of an esophylactic action of ultraviolet rays, because in several of the patients in whom the disease process was localized on the face, improvement was noted following irradiation of only the body.

Common Disabilities of the Foot: Their Diagnosis and Treatment. By Armitage Whitman, M. D., New York, N. Y., in N. Y. State J. M., 320:6:319, March 15, 1930.

"Infections of the Hand" by Dr. Kanavel of Chicago pointed out the various possibilities of infections and injuries of the hand and in a comparatively short time surgeons began to see that to a man in almost any walk of life a disability of the hand was a serious matter.

A person with a disabled lower extremity cannot get about at all. If his disability is not complete and all he suffers from is pain, the effect upon his or her disposition is immediate and severe.

Regarded from a business point of view the man or woman whose feet are one long ache, and who cannot move from place to place without a dreaded effort, is no asset to any organization.

In the attitude of fatigue we may assume that the muscles, exhausted, have given away and the arch of the foot is supported by the ligaments alone. In this attitude the toes are turned out, in the familiar position demanded by the dancing teacher, and by our grandmothers who brought our mothers up to "turn their toes out like a lady." The body weight then falls on the inner side of the foot, the weak side. The astragalus, the pivotal bone around which all the movements of the foot take place, rolls downward and inward off the oscalcis and rests upon the long plantar ligament.

The feet are the foundation of the body and their inspection should be part of the routine physical examination.

In general, weakness of the foot is accompanied by a slow and usually unremarked change in the patient's habits. Where once he ran he now walks. Where once he walked he now takes a car. Where he stood he sits. Where he smiled he snaps.

Remarks upon diet in a paper on the feet may seem somewhat out of place, but the public in general does not recognize the very direct effect that overweight—plain fat—has upon the feet and general condition.

The treatment of the feet begins in the head. The way in which they are used is of paramount importance. A poor foot properly used is better than the best used badly.

The feet should be held parallel, toes turned neither in nor out. The whole foot should be placed upon the ground lightly and softly, in contrast to banging on the heels. The feet should be placed practically one in front of the other, as if walking a tight rope. The steps should be shorter, and if necessary the knees may be slightly bent. This gait necessitates balance and balance is only attained by use of the muscles of the entire body, particularly of course those of the leg and trunk, resting when the muscles become fatigued from the unaccustomed exercise.

If any limitation of motion is present the foot must be manually stretched and strapped with adhesive plaster in the adducted attitude until all such stiffness has disappeared and motion is free in all directions.

The patient must be given a proper shoe, which he must wear when using the feet for working purposes. A working foot must be clad in a working shoe. When going to dances or dining out their foot gear may be as absurd as they please.

There are now so many types of good shoes that a detailed description is unnecessary. The points to consider are a fairly low, fairly broad heel; a narrow shank so that when the shoe is laced tight the waist of the foot has a comfortable feeling of support; a straight inner border, so that the great toe may function properly; a toe broad enough to allow all the toes to touch the ground.

The second great disability of the foot is depression of the anterior arch of the foot, anterior metatarselgia, or Morton's toe.

In cases in which the deformity is fixed forcible correction of the toes, sometimes necessitating division of the dorsiflexor tendons is indicated.

The third most frequent of these common curses is hallux valgus—an inward deviation of the great toe toward the median line of the foot. This results in great prominence of the metatarso-phalangeal joint, and is usually the fore-runner of a bunion. One must be careful not to confuse hallux valgus with the general enlargement of the margins of the joint that result from the proliferative bony changes of osteoarthritis. The condition is almost always primarily due to the wearing of high heels and pointed toes.

Early cases may be relieved by proper support for the weak foot that accompanies them, by manual manipulation and by proper shoes. More severe cases call for operative treatment.

Manipulation of Joints. By Clarence H. Heyman, M. D., F. A. C. S., Cleveland, Ohio, in The Jour. Bone & Joint Surg., 12:1:23, January, 1930.

An injury of the synovial membrane or joint cartilage is accompanied by more or less damage to ligaments and capsule, muscle atrophy and muscle spasm, with contracture or shortening of muscles, ligaments or tendons. Even early atrophy and diminution in the number of the anterior horn cells of the spinal cord has been demonstrated. Relaxed ligaments, poor muscular development, and hypotonia of the muscles make the joint more susceptible to static strain or injury with resulting hyperaemia and thickening of the synovial membrane, as in villous arthritis.

Summary

Forcible manipulations accomplish relief from joint pain and stiffness by the rupture of adhesions, or by the reduction of a displaced fibrocartilage in internal derangement of joints, as in the knee, wrist or jaw. This important form of therapy is being neglected by members of the medical profession who should become familiar with the methods of manipulation. Unintelligently applied force is inherently a dangerous means, and the use of extreme force is always to be condemned. The public, and many physicians as well, has been led to believe that treatment by manipulation is not included in the resources of the qualified physician or surgeon. There is nothing mysterious in the art of the bonesetter, and the rationale of so-called bone setting in the indicated case is readily understood when we review our knowledge of the anatomy and pathology of joints. By careful observation of our patients and the recording of our results we can put this procedure on a rational basis.

Tibial Fractures into the Knee Joint. By Arthur N. Collins, A. B., M. D., F. A. C. S., Duluth, Minn., in Minnesota Medicine, xiii:5:285, May 1930.

Early motion in a series of 20 cases is seen to be coincident with the best results, judging by the follow-up reports.

The writer wishes to emphasize in the closed method:

Elevation of the extended leg to a sharp angle (30 to 45 degrees) to rapidly reduce swelling at the knee.

Puncture if necessary intra-articular effusion.

Buck's extension or Thomas splint.

Massage after the first week.

Early motion second to fourth week.

Removable plaster during the third or fourth week for support and to facilitate treatment.

Occupational Therapy in the Treatment of Fracture of the Joint. By J. William Hinton, M. D., Assistant Professor of Surgery, New York Post-Graduate Medical School and Hospital; Assistant Attending Surgeon, Bellevue Hosital; in Arch. Surg., 20:5:851, May 1930.

Three and one-half years ago, Dr. Carl G. Burdick, director of the fourth surgical division, Bellevue Hospital, formulated certain principles for the care of patients with acute fracture. At that time it was decided to use occupational therapy in preference to massage and physiotherapy in the treatment of fracture of the joint. On the children's surgical service, Dr. Burdick had encountered six cases of myositis ossificans in fractures about the elbow. In all of these cases massage had been used, and this was considered the etiologic factor in producing the myositis. Therefore it was thought that vigorous massage might produce the same changes in adults, though to a lesser degree.

Institutional Occupational Therapy. By C. J. Elsasser in Western Hosiptal Review, XV:II:21, April, 1930.

Perhaps one of the paramount endorsements of occupational therapy, in its connection with industrial work, is the fact that the Golden State Hospital and Clinic of Los Angeles, has maintained such a department for a period in excess of ten years. Manifestly, this institution would not have continued its investment and the overhead connected with the operation of a department of occupational therapy if it did not assist in obtaining good functional results.

Physical therapy, which includes hydrotherapy, electrotherapy, massage and limited mechanotherapy, is a recognized associate of occupational therapy.

Diathermy in Gynecology. By G. Kolischer, M. D., Chicago, Ill., in American J. Obstet. & Gynecol. xix:4:550, April, 1930.

Medical diathermy alone will almost never cure chronic gonorrheal endocervicitis or endometritis, but it is a very powerful support to the routine treatment. The principles of the technic of administering diathermy deserve some discussion. The introduction of an active electrode into the urethra or cervix or uterine cavity is not only apt to produce serious complications but is also entirely unnecessary. Intra-urethral electrification is not only very painful but also apt to produce periurethral abscesses and occasionally perforation of the urethral wall. The intrauterine administration of high frequency currents is quite often followed by extensive parametritis and perimetritis, the development of ovarian abscesses and pyosalpinx with all the dangers of pelvic peritonitis. It is absolutely unnecessary to take such chances because the intimate apposition of the active electrode to the urethra, respectively cervix and uterine body, permits the operator to develop within these organs any desired degree of heat.

It must be understood that heat carried closely to the physiologic limit, though not producing coagulation, causes precipitation of the globulins within the cells, thus impairing their vitality.

Another important factor is the length of each seance. With the rising tolerance of the patient this time is progressively extended up to one to two hours.

It may be truthfully asserted that the combination of routine treatment with diathermy and aseptic protein shock, furnishes definite relief in a good many instances of chronic gonorrheal endocervicitis and endometritis that resisted all other therapeutic efforts.

While in chronic parametritis and perimetritis the administration of medical diathermy certainly shortens the time of absorption, the most salubrious effect of this

modality is shown in acute and subacute cases of this kind.

Surgical diathermy has a wide field of usefulness in gynecologic work.

Chronically infiltrated periurethral glands and ducts are quickly and definitely obliterated by electrocoagulation with a fine wire.

The destruction of urethral caruncles by electrocoagulation furnishes excellent results.

Electrocoagulation in combination with radiotherapy furnishes definite results in a surprisingly large number of instances.

The Combined Use of Diathermy and Oxygen in the Treatment of Bronchopneumonia. By Stuart Pritchard and Luther A. Tarbell in Bull. Battle Creek San. and Hosp. Clinic, 25:1:47, January 1930.

Diathermy and oxygen have been used by one of the writers (S. P.) since 1914 in some of the more severe cases of bronchopneumonia. During the past three and a half years diathermy has been used routinely in all pneumonic affections while oxygen has been administered in all cases except those which failed to show respiratory embarrassment. During this period we have treated 211 cases showing definite signs of pneumonia and 114 cases which might be considered as borderline.

Technic.—A small portable unit is desirable. Bare flexible metal electrodes covered with electrode paste are preferable. The electrodes are applied in the anteroposterior position except in cases of severe pleural pain when the lateral position seems to give more satisfactory results. The smaller plate is used in front in severe cases so that the adjustment can be made without unduly disturbing the patient. The treatment may be given while the patient is in the oxygen tent. If the disease is on the right side the electrode is shaped so as to extend over to the left side and include some of the cardiac region. The electrodes should be made large enough to extend somewhat beyond the diseased area. This may be a factor in inhibiting an increased involvement. In the more severe types of pneumonia, treatment may be given three or four times in twenty-four hours.

The following deductions may be drawn from our experience:

The pain of accompanying pleurisy is frequently decreased and often relieved.

The respiratory rate may be lessened.

A general soothing and quieting effect is often experienced, even to the extent of producing sleep.

Cough may be subdued.

Expectoration or mucus may be loosened and the bronchial secretion is cleared, relieving cough and producing rest.

Perspiration is induced.

The fever in most instances is temporarily lowered.

The patient frequently feels more comfortable and an irregular thready pulse may become more stable. This is true if the cardiac area has been included in the treated area.

Cyanosis will sometimes vanish and in many cases decrease. Stewart thinks this is the case when the lower left lobe is involved and treated, explaining this by the difference in the blood supply. It is our belief that a better explanation lies in the fact that in some instances the heart muscle has been subjected to the diathermy.

Since 1914 we have refrained from using diathermy in pulmonary tuberculosis or in pleurisy suggestive of tuberculous origin on account of the fact that necrotic tissue may be disintegrated too rapidly by over-stimulation. We have observed a number of cases in which it was reasonable to believe reactivation or exaggeration of the disease occurred, by the indiscriminate use of diathermy in unsuspected cases of pulmonary tuberculosis.

Dosage.—In the above series we have used much larger doses of diathermy than is advocated by Stewart and many other authorities who recommend a milliamperage 14—2400 for twenty minutes in the adult repeated two to five times in twenty-four hours, while in children 1100 milliamperes is the average recommendation.

It has been our custom to increase dosage up to tolerance which varies with the size of the electrode used. In adults 4000 milliamperes is the maximum while in children it is 2600 milliamperes. Tolerance is the greatest amount of amperage which can be borne without discomfort.

It is evident that the administration of oxygen is not a simple procedure and that some equipment by which the quantity, temperature and mixture of the elements can be accurately measured with the least possible disturbance to the patient is of the greatest value. After repeated trials and failures Dr. Paul Roth came to our rescue and in 1924 designed and developed the head tent.

Conclusions

The combined use of diathermy and oxygen carefully and judiciously used are a decided therapeutic help in most cases of bronchopneumonia if the treatment is administered as soon as the disease is suspected. It is probable that in many instances a definite bronchopneumonia may be aborted.

The Continuous Bath Therapy of Hebra—Its Use in the Allgemeine Krankenhaus in Vienna. By Gustav Riehl, Jr., M. D., Vienna, in Jour. A. M. A., 94:14:1058, April 5, 1930.

Types of Cases Suitable for Treatment by Continuous Baths

Pemphigus.—Although the water does not actually heal pemphigus it shortens the duration of the rash and is a great relief to the patent.

Burns.—These most severe cases of burns are treated from the beginning with our method; if the case is a doubtful one, we do not put the patient into the tub at once but first treat him by other well known methods to avoid too great a strain on the heart. The water is of the greatest value in accelerating the separation of the crusts. Depending on the state of the heart, the patient is kept in the water continuously or for a few hours each day. Cardiac stimulants are given in every case.

Erysipelas.—The continuous bath is a very good method for the treatment of erysipelas.

Acute weeping eczema.—Here the continuous baths bring relief within a short time in a much more convenient way than dressings.

Ulcers.—Our method is frequently of great value in the treatment of ulcers produced by roentgen rays.

Decubitus or Bedsore.—The continuous baths give excellent results in the treatment of decubitus or bed sore.

Surgical.—The treatment of infected wounds by means of continuous baths, especially of phlegmonous processes, is of the greatest importance.

Fistulas of the stomach, gallbladder, small intestine

and urinary bladder, with the consecutive, often unavoidable irritation of the skin, are favorably influenced by the water.

It is interesting that in patients who have to be put into the water with fresh operative wounds, infection never occurs.

For frozen extremities the continuous baths have proved to be of great value, especially during the war.

Medical.—Patients with very painful arthritis of various origin often state that their sufferings are considerably lessened by the continuous bath.

Neurologic.—The water has an enormously soothing influence in cases of tetanus, in which a new convulsion is likely to develop with the slightest irritation.

Problems in Physical Therapy Given to Students at Wellesley College

I. VALUES OF CERTAIN ULTRAVIOLET TRANSMITTING GLASSES

I Solar Ultraviolet Light.
- A. Found in wave lengths of 320-291 millimicrons or 3200-2910 Angstrom units (3)
- B. Excluded by ordinary window glass, but transmitted in varying amounts by certain glass substitutes.
- C. Valuable because it increases the hemoglobin content of the blood, aids the metabolic rate, increases the utilization of lime and phosphorus, aids in the cure of surgical tuberculosis and rickets, and has a general germicidal action. (13)

II Relative Transmissibility of Certain Glasses.
- A. Fused Quartz (3) transmits 90 percent of the vital ultraviolet but is too expensive for use except in experimental laboratories.
- B. Corex Glass (15) (5) made by Corning Glass Works; Rivals quartz in transparency in region of 260-300 millimicrons. Transmits 91.4 percent—91.8 percent of vital rays. Undergoes no appreciable change by solarization, damaged by exposure to quartz mercury arc.
- C. Vita Glass (9)—transmits about 60 percent. Decreases considerably on exposure for any length of time to ordinary weather conditions.
- D. Helio Glass (Vioray) (15)—about the same as Vita Glass also decreases after exposure. Degenerates to 30 percent transmission.
- E. Cel-O-Glass (15)—not a true glass, film of cellulose acetate on wire mesh. About 30 percent transmissibility. Degenerates completely after prolonged exposure. Cheap to replace.
- F. Flex-O-Glass (8)—also not a true glass, paraffin treated cloth. Has high enough transmissibility to serve as partial protection for rickets.
- G. Cellophane (7)—not true glass. Has 70 percent transmission when new and drops only 10 percent in year. Becomes brittle and breaks easily after exposure. Very cheap to replace.

III Experimental evidence as method for determining values of various glasses.
- A. Vita Glass
  1. Swathwick School (11) boys in class room with Vita glass windows increased weight as compared to boys in other rooms by three pounds, their height by half an inch, their red corpuscle content by 8.63 percent, and their school attendance by 3.73 percent.
  2. Columbia University tests (3)—on rats. Only rats kept in cages directly behind Vita glass windows were protected from rickets. All others in different parts of room lighted through same windows were unprotected. (See also Clark's experiment (2) to show that ultraviolet light is not at all strong at any appreciable distance from ultraviolet transmitting windows.)
  3. Physio-Therapy report on window glasses (8) chickens on rachitic diet were protected by the ultraviolet from the sun's rays received through Vita glass.
  4. Scheard and Higgins Experiments (9) (10) —Chicks sunned through Vita glass, fed on standard Wisconsin diet, showed normal increase in growth and weight and no abnormal growth of parathyroids such as were shown in chicks under amber and blue glass.
- B. Corex Glass.
  1. Though not actually tested biologically by the committee which reported to Council on Physical Therapy (8) they believe that it ranks very high, mainly because of results of spectroscopic tests.
  2. Made in different colors (5) which omit various parts of the spectrum, but always transmit ultraviolet (eg.G985 B—a blue glass—transmits ultraviolet, but eliminates green mercury line.)
- C. Flex-O-Glass and Cel-O-Glass
  1. Cel-O-Glass slightly better than Flex-O-Glass in its transmission of vital rays as seen in experimental results on chickens. (8)
- D. Colored Glasses used by Maughan (6)
  1. Green glass 7.2 mm. thick fair cure of rickets through transmission of ultraviolet.
  2. Clear glass—4 mm. or 5 mm. thick—no help.
  3. Purple Glass—transmitted fair quantity of ultraviolet—helped rachitic condition immensely.
- E. Glasses used by Scheard and Higgins (9) (10)
  1. Cathedral vita glass—transmits vital rays necessary for normal growth of chicks.
  2. Blue glass—transmits a very little ultraviolet —more than ordinary window glass, however.
  3. Amber glass—no ultraviolet transmitted. Chicks showed decided decrease in weight and increases parathyroid tissue.

IV Practical Application of Ultraviolet transmitted by glass.
- A. In hospital solaria where the best glass can be used and the patients can be directly exposed, these glasses can be of value, also in nurseries, so that the baby might be given a sun bath.
- B. In schools and business offices, the glass is not particularly worth while since only the people immediately beside the windows get any benefit from the ultraviolet which they transmit. A few minutes outdoors will far outweigh anything they may get within.
- C. In experimental laboratories the glass may be put to good use and eventually some method may be discovered so that the ultraviolet may be sent all over a room with its beneficial results instead of just under the windows. May eventually get a glass which is as cheap and durable as window glass yet will transmit ultraviolet to its utmost intensity, in which case it should be used exclusively in every building where health is desired, for even if rays do not get to the middle of the room they are valuable to the "window-sitter."

ELIZABETH R. BURDICK.

Note: Numbers in brackets refer to numbered items in bibliography.

Bibliography

(1) Bunderson, H., Lemon, H., Falk, I., Coade, E., "Ultraviolet Radiation from Sunlight and Incandescent Lamps." "Its Transmission through Window Glass and Substitutes," J. A. M. A. Vol. 89, pp 187-89.

(2) Clark, J., "Probable Amount of Ultraviolet Radiation Obtained Indoors through Ultraviolet Transmitting Glass," Science. Vol. 68, No. 1755, pp 165-166.

(3) Eddy, W. H., "The Use of Ultraviolet Light Transmitting Windows," American Journal of Public Health. Vol. 15, No. 12, pp 1470-1479.

(4) Goodman, H. and Anderson, W. T., "Quantitative Study of Ultraviolet Transmitting Glasses," Boston Medical and Surgical Journal. Vol. 197, No. 28, pp 1316-1318.

(5) Hood, H. P., "A New Ultra Violet Transmitting Glass," Science. Vol. 64, No. 1638, pp. 281-282.

(6) Maughan, G., "Ultraviolet Wave Lengths in the Care of Rickets," American Journal of Physiology. Vol. 87, pp. 381-398.

(7) Pfund, A. H., "A Practical Window for Transmitting Ultraviolet Rays," J. A. M. A. Vol. 91, pp. 18-19.

(8) Report on Window Glass Substitutes, J. A. M. A. Vol. 88, pp. 1562-67.

(9) Scheard, C. and Higgins, G., "Effects of Selective Solar Irradiation on the Growth and Development of Chicks," American Journal of Physiology. Vol 85, pp. 290-298.

(10) Scheard, C. and Higgins, G., "Effects of Selective Solar Irradiation on the Parathyroid Glands of Chicks," American Journal of Physiology. Vol. 85, pp. 299-310.

(11) "Ultraviolet Rays in Schools," Journal of Chartered Society of Massage and Medical Gymnastics, Vol. 12, pp. 210.

(12) "Ultraviolet Windows," Science. Vol. 70, No. 1815, pp. X-XII.

(13) "Vita Glass, Notes on Indoor Heliotherapy," N. Y., Corday, 1927.

(14) "Vita Glass," Vita Glass Corporation, N. Y. 1927.

(15) Wyman, E. T., "Use of Ultraviolet Rays in Treatment with Special References to Children," New England Journal of Medicine. Vol. 198, No. 10, pp. 510-513.

II. HYDROTHERAPY.

Introduction: Hydrotherapy is the method of treating diseases by application of hot and cold water—a recognized treatment by the medical profession as an efficient therapeutic agent. The efficacy of water as hygienic medicine has been recognized for a long time—in fact, its use externally apart from cleanliness is as old as medical art itself.

America is said to be behind all other nations except England in the use of hydrotherapy. In Germany, for instance, thirteen out of nineteen Universities give courses in physical therapeutics and much time is devoted to hydrotherapy. The latter is reported to have the widest field of usefulness in that country and its use is considered necessary to general practitioners as well as to clinics.

Modern hydrotherapy is founded on a solid rock of physiology and pathology.[1] Dr. Wilhelm Winternitz did much in physiological investigations and rescued hydriatic treatments from empiricism and quackery. He, and John H. Kellogg of Battle Creek, Mich., and Simon Baruch of New York have advanced the knowledge of hydrotherapy in America.

Muscle reeducation under water is not wholly replacing treatment of other types by any means: baking, massage and muscle training. One type of work augments another kind. Exercise or massage bring good reaction —so hydrotherapy is combined with "thermo," light and "mechanico" therapy.

Hydrotherapy includes the use of water in three physical states: solid, liquid, and gaseous.[1] Water is the medium for the conveyance of temperature—the greater the variation of temperature between the body and water, the greater the thermic irritation. By varying pressures and temperatures, mechanical and thermal irritation is increased or decreased as desired.

Use of hydrotherapy: Hydrotherapy is beneficial for many types of cases: fractures, poliomyelitis, spastic paralysis, congenital dislocation of the hip, hemiplegia, neurotic conditions, some types of scoliosis, arthritis and muscular rheumatism. Often it is used instead of pharmocotherapy. For example, a full tub at 90 degrees F. is better than "trional" in cases of insomnia and hot compresses on the abdomen in gastric ulcer are better than morphine. According to the temperature, blood pressure is raised or lowered, pulse rate increased or decreased, respiration quickened or deepened and action on the sensorium stimulated or depressed. Hydrotherapy makes patients feel better, and eat and sleep better. The important place of this field of work in neurasthenic cases is well known to overshadow all other uses, however. The water treatment, Strumpell and Matthes go so far as to say, acts chiefly as psychical. Local packs or compresses may be used for headache, sore throats, tonsilitis, diphtheria, earache, pleurisy, and pneumonia. The form of treatment for various diseases will be discussed under a separate heading.

Hydrotherapy is prescribed by the following specialists in the medical field:

Orthopedist—whirl pools and Scotch douches.
Dermatologist—continuous baths.
Urologist—sitz baths
Obstetrician—sitz baths and hot blanket packs.
Gynecologist—sitz baths and partial packs.
Neurologist—douches and hydroelectric baths.
Internist—Nauheim baths and partial packs.[2]

Certain precautions are necessary in administering hydrotherapy. A trained physiotherapist is needed to do the work—for temperature and duration are important and must be watched carefully. Intelligent prescribing and observation of patients during treatment as well as careful reading of records are essential. There are the following dangers:

Fainting—if the temperature is over 98 degrees F. for too long a time. In such a case, the necessary treatment is stimulation by mouth—and warm blanket wrapped around the individual.

Chilling—to a person with low vitality.

Scalding.

Drowning—patient must be watched constantly.

Convulsions and possible heat prostration.

Complications: bath rash, abrasions.

Kinds of Treatment in Hydrotherapy: Some baths are *stimulating:* cold or alternate packs (to reduce fever), cold or alternate spray or shower, cold or alternate douche, cold plunge, cold foot baths or hot sitz baths for pelvic conditions.

[1]Pratt, Joseph. "On Development of Hydrotherapy."

[2]Lowman "The Use of the Therapeutic Pool."

Some treatments are sedative: warm or hot packs (for relaxation) hot foot tub baths (to promote sleep) and continuous baths with the temperature 93-95 degrees. A continuous bath lets a person drop off to sleep—its use is for extensive burns, cerebral excitement and delirium, in cases of chronic ulcerated areas, or chronic meningitis or brain tumors.

Other treatments are for the purpose of elimination: warm packs (local or general), mud baths followed by a shower, whirlpool baths (to soften the tissue, produce hyperaemia, and relieve internal congestion). This whirlpool bath is used for joint injuries with congestion and stiffness.

Treatments may be applied in forms of a tub, baths, ablutions, packs, rain baths and douches.

Treatments may be given in cold, hot or neutral temperature, ice, simple receptacles, sheets and towels. Well arranged rooms are necessary with good apparatus and utensils—and of course with proper heat, lighting, and ventilation.

Preparatory treatments relax and warm the patient and bring the blood into preparation to extract heat by administration of the fan douche at a lower temperature. Heat can produce copious perspiration.

Douches work on the whole surface of the body. The volume, temperature, and pressure are carefully prescribed. The friction of impingment on the skin stimulates circulatory reaction.

The circular douche or needle spray supplements every preparatory treatment. It is always followed by a fan douche at a lower temperature. The fan douche (made by placing one's index finger on a stream of water) is given to a person from heels to shoulders while the patient revolves. By means of this douche, one is able to educate a patient's reaction to cold water delivered with pressure.

The so called jet douche consists of a solid stream of water after one is accustomed to the others—at 76 degrees. The Scotch douche is the alternation of hot and cold jets of water against a local area of skin. Baruch used this type for sciatic and rheumatic scoliosis and sciatica at 70 degrees F. and then at 110 degrees applied to the spine for the general effect. The results are very stimulating.

The vapor douche is applied to circumscribed skin areas—for use in rheumatism, neuritis, nephritis, lumbago and sciatica.

The rain douche is an overhead shower combined with a needle spray at the same pressure and temperature as for rinsing hair after a shampoo.

Electric light baths cause perspiration in a short time and avoid exposure to prolonged heat. The heat of the electric light readily penetrates the skin and other living tissues—and encourages heat elimination by causing free perspiration. It prepares the skin for cold tonic procedures and is indicated for dropsy, anemia, obesity, diabetes, syphilis, neuritis, neuralgia, rheumatism and acute nephritis. Contraindications are exophthalmic goiter, advanced nephritis and valvular heart lesions.

A vapor bath elevates the temperature of the skin and body—when the vapor is turned on slowly. This vapor softens the epidermis and eliminates sebacious material. Respiration is shallow and quicker. The vapor bath relieves pain of nephritis, rheumatism and the pressure of exudates. This treatment should not be used for feeble or old patients, or those with exopthalmic goiter or cardiac weakness.

Fomentation is the application of moist heat by cloths 140-148 degrees F. The effect is a local vapor bath with a temporary paralysis of the vaso motor nerves at first and a passive dilation of cutaneous vessels. Pain caused by congestion is relieved and contracted muscles are relaxed. It stimulates excretion of perspiration over the whole surface of the body. It is useful in many conditions: stiffened joints, sprains, sciatica, lumbago, intercostal neuralgia, renal suppression, inflammation of the liver and congestion of the spleen. Fomentation, preceded by a foot bath and followed by a needle spray is an excellent preparatory treatment.

The salt glow consists of rubbing the whole body with salt—causing a pleasant after feeling of stimulation which is good for those who need tonic of friction. There is a circulatory reaction from the chemical irritation of the salt and the mechanical stimulation of the rubbing of crystals. Moist crystals of ice water produce a thermic reaction. The use of this salt glow is for people who are frail and need gentle stimulating tonic baths to help circulation, elimination, and nutrition. It aids anemia, nephritis, diabetes.

A shampoo is a thorough cleansing of the entire person with soap lather applied with friction and followed by affusion with clear water. It frees body of exfoliating epithelium and odors. Friction dislodges grease. Muscles relax and there is liberal exchange of carbon dioxide for oxygen.

Sitz bath consists of the immersion of the thighs, buttocks, and abdomen—with hot, warm, neutral, cool or cold water (and friction). It is often accompanied by a foot bath. Blood is diverted from the internal viscera, the portal circulation is drained and pelvic circulation is excited. The use of the sitz bath is to restore menstrual function after a chill, to relieve pain of inflamed hemorrhoids, sciatica, lumbo-abdominal neuralgia and neuralgia of the ovaries, testicles and bladder.

Mineral baths in use at Neuheim, Germany, are for the treatment of cardiac weakness with dilatation and chronic nephritis. The water has calcium chloride and sodium chloride in solution and is heavily charged with carbonic acid gas. This solution at neutral temperature stimulates the skin and dilates its vast capillary network. An improved distribution of blood of the entire body is produced without the relaxing effect of heat and the vigorous circulatory reaction to cold. The work of the heart and kidneys is lessened and other viscera are relieved of congestion.[1]

The Use of the Therapeutic Pool: In paralysis cases, it is understood that the patient should not be allowed to do exercises until after all muscle soreness has disappeared—which is usually after the 10th or 12th week. It is now customary to begin work in a therapeutic pool after the 5th or 6th week.

People with muscle soreness relax in warm water to make three times the voluntary movement of a given part without pain than would be possible out of the water. In this way, movement is obtained and a psychological attitude established. After such a treatment, the fears of the acute stage are gone and it is possible to save a certain amount of muscle and nerve tissue. A marked contrast is shown with cases which have been left without treatment until after the 12th week and those which have received hydrotherapy treatment after the 6th week. The second six weeks of convalescence is a very vital time in the restoration of function. With exercise, the voluntary action of peripheral muscles produce nutritive and eliminative stimulation for the anterior horn cells. Motion of the joints affects the circulation of blood and lymph in and about the joint.

The patient is handled with care—legs are supported

[1]Discussion based on Wright's "Organization and Management of Hydrotherapy Clinic."

on splints so they'll be kept in a correct position. The stretcher is lowered to the water and the technician helps from there. Exercises which are impossible to do on tables because of restriction in certain planes may be performed in the water: rolling for spinal and abdominal muscles, lateral bending from the waist, bicycle for quadriceps and gluteals—in both prone and supine position. The technician can control the force of movement in a weak group and restrain movement in an overacting group. The buoyancy of the water and the lightness of the body when the force of gravity is eliminated makes treading motions easy.

Hydrotherapy and Mental Cases: Dr. Simon Baruch has done much to give hydrotherapy a fresh impetus—and apparatus is being installed for nervous and mental cases, for it has proved a very practicable and effectual form of treatment. It has a sedative effect on restless, sleepless or excited persons. In a hospital without apparatus, cold ablutions, cold affusions, dripping sheets or cold packs may be used. If apparatus is available, hot air baths, circular douches, fan, jet, and Scotch douches are possible. The value of these applications has already been discussed.[4]

Generalizations and Conclusions: Cold and hot water act directly on the surface treated and reflexly through the central nervous system on the circulation in other parts of the body. Circulation in the abdominal organs is influenced by application of heat or cold to the surface of the body. There is an influence on blood pressure. Irritants which contract vessels elevate blood pressure—cold, and those that dilate the vessels lower blood pressure—such as warm things. Cold diminishes the frequency and increases the forces of cardiac contractions and warmth increases the rate. Cold causes a local increase in the number of erythrocytes and leucocytes in capillary circulation. Warmth—hot full baths, hot air, electric light baths increase the metabolism and increase the destruction of albumen. Heat lead to respiration of increased frequency of more superficial character. Both heat and cold diminish the sensibility of peripheral nerves and are of importance in stilling pain.[5]

A great value of hydrotherapy is that it acts on the circulation, respiration, blood pressure and temperature without active muscular exertion on the part of the patient. It effects the mind of the patient greatly. We are well over the threshhold of the great revival of physiotherapy.

MARY DAVIES.

Bibliography

Granger, Frank Butler, "Physical Therapeutic Technique," W. B. Saunders, 1929.

Hutchins, Charles, "Physiotherapy at Fort Sheridan," American Journal of Clinical Medicine, August, 1919.

Lowman, C. L., Roen, Susan, "Use of the Therapeutic Pool," PHYSIOTHERAPY REVIEW, August, 1928.

Plastridge, Alice L., "Physiotherapy and the Swimming Pool," PHYSIOTHERAPY REVIEW, August, 1928.

Pratt, Joseph, "On the Development of Scientific Hydrotherapy," Reprint Boston Medical and Surgical Journal.

Tuttle, George T., "Hydrotherapeutics," American Journal of Insanity.

Wright, Rebekah, "Organization and Management of Hydrotherapy," PHYSIOTHERAPY REVIEW.

Wright, Rebekah, "Organization and Management of a Hydrotherapy Clinic," PHYSIOTHERAPY REVIEW.

III SURGICAL DIATHERMY, ENDOTHERMY, OR ELECTRO-SURGERY.

I. Definition: production of destructive heat within the tissues caused by the resistance that these tissues offer to the current.

II. Principles

The amount of heat is dependent on

(a) amount of current. 500-2000-4000ma.

(b) resistance of body through which current must travel.

(c) size of electrode used.

III. Type of electrode

(a) inactive

(b) active

IV. Classification of Forms of Surgical Diathermy.

A. Monopolar: a modification used when there is not enough room for bi-polar, as in treating tonsils. The current is turned on before the active electrode is applied.

1. Indirect Fulguration:

The patient holds the inactive electrode which is connected to the uni-terminal post. The spark gap is barely open. The operator holds a well sharpened lead pencil over the lesion and draws sparks from it. The current passes from the machine to the patient and to the ground through the operator. The appearance is first, a greyish-white, then, black. This method is gentler than

2. Direct Fulguration:

An ordinary needle is inserted into a retaining handle. The patient is attached to the Oudin terminal. A moderate degree of current is turned on and the spark jumps and hits the parts. It is a very painful process—kept up until the lesion is greyish.

(b) Electro-Dessication (Clarke) } identical
Mono-polar Endothermy (Wyeth) }

The machine is adjusted so that it will produce a white spark ¼-½". Touch the part with the electrode, passing the spark rapidly over the part to be removed until it is covered with a white film. This process dehydrates, therefore shrinks the tissues, but the cellular membrane should remain intact Mono-polar Endothermy is easier to control than bi-polar Endothermy or Fulguration.

B. Bi-polar (D'Arsonval) Endothermy.

With this the current is turned on after the active electrode is applied. The inactive electrode is attached to the other binding post and is in contact with the lesion. The current passes from one electrode through the patient's body, to the other electrode.

1. Electro-Coagulation (Clarke) }
Bi-Polar Endothermy (Wyeth) } identical.
Surgical Diathermy }

The needle is inserted into the tissues. It breaks down the cellular structure of the tissues and condenses them into a necrotic mass. It is a painful process. Because of the amount of destruction, and the sloughing off of the tissues, time is needed for recovery. Should only be done a little at a time unless malignancy is present.

2. Cutting Current:

(a) Radio Knife (Clarke) }
(b) Endotherm Knife (Wyeth) }
(c) Acne Sector (Kelley and Ward) }

3-8 million frequency used, therefore necessity for radio tubes. The voltage is quite small.

[4]Lowman. "Use of the Therapeutic Pool."
[5]Pratt, Joseph. "On the Development of Scientific Hydrotherapy."

A very fine grey line of destruction is left. There is no incrustation, and lymphatics are sealed as it cuts.

Technique: (Wyeth) Describe in the healthy tissue, a ring of destruction which shall surround the malignant area and coagulate the necrosis thus shutting off and destroying the blood vessels and lymphatics to and from the affected parts. After this, destroy the malignant growth. After destruction, curette away and go over the region with the current to assure further penetration of heat and destroy any malignant cells still remaining. (The knife is connected and mass is removed by circular incision.)

Danger: May not gauge the distance correctly. Might cook part of the artery.

V. Use of Electro-Surgery.

A. Tonsils:
   (a) Electro-dessication—shrinks tissues.
   (b) Electro-coagulation destroys tissues, leaves black or white scar.

   Advantages over surgery: Good for adults who must use voices or who cannot take time from work.

   Disadvantages: Not applicable to children.

B. Skin Blemishes:
   (a) Mono-polar method used for small lesions—fulguration.
   (b) Bi-polar method used for larger lesions or tumors.

   Lesions treated:
   1. Moles
   2. Warts
   3. Papillomas (enlarged pimples)
   4. Sebaceous Cysts
   5. Corns
   6. Boils
   7. Spider Nevus (Birthmark)
   8. Angiomas (small vascular or muscular tumors)
   9. Telengiestases (Dilatation of capillaries of smaller blood vessels)
   10. Tatoo Marks
   11. Local Skin Infections
   12. Urethral carbuncles (small fleshy red growths on post mearus urinarius)

   Advantages of such treatment:
   1. Ease of Application—quick small current.
   2. Perfect Control: current used is dependent on size of blemish.
   3. Inconspicuous: lesion is no more noticeable when Endothermy is properly used when patient leaves the office than when she enters. Little or no swelling.
   4. Bloodless.
   5. Local anesthesia used usually to prevent feeling of burn and keep patient quiet.
   6. Small soft scar: pliable, practically same color as untreated skin surrounding it.

C. Hemorhoids, Anal fissures, and so forth.
D. Gastro-enterostomy (Evans Memorial Hospital).
E. Appendicitis (St. Francis Hospital, Hartford).

VI. Advantages of Endothermy:
1. Decreased danger of metastasis (change in seat of disease), or likelihood of recurrence.
2. Alleviation of pain—especially in skin blemishes.
3. Practically no hemorrhage.
4. Practically no surgical shock.
5. Accuracy of dosage because current is absolutely under absolute control of operator.
6. Sterilization of wound incidental to thrust—no spreading of infection or danger of post-operative infection.
7. Patient's post-operative condition usually satisfactory, leading to quick recovery and good cosmetic results. (S. B.)

VII Disadvantages of Endothermy:
1. Tissues must be fairly accessible: i. e. not buried beneath tissues.
2. Intra-abdominal and intra-thoracic growths are inaccessible.
3. Not possible for operator to lay bare important structures overlying his field by blunt dissection therefore must avoid working in close proximity to large bloodvessels or must ligate them first.
4. Normal tissue must be destroyed along with malignant tissue in immediate vicinity of electrode.
5. Severe or fatal hemorrhages may easily be caused if area dessicated extends to wall of a large vessel.
6. Formation of keloids (fibrous growths in scar tissue) in operations of this kind is fairly common, especially when large area of skin surface is involved.

VII. Men well known for working-up of endothermy technique.
1. Clarke, William L., of Philadelphia.
2. Wyeth, George, of New York: Endothermy in Malignancy.
4. McFee, William, of Haverhill, Tonsilectomy—Use of Electro-Coagulation.

DOROTHY KANRICH.

Bibliography

1. Granger, Frank B.: "Physical Therapeutic Technique," W. B. Saunders Co., Phil., 1929.
2. Reprints in Physiotherapy: H. G. Fischer & Company, Inc., Chicago, 1927.
   (a) Kolischer, G., "Surgical Diathermy."
   (b) Chapman, "Electro-Surgical Removal of Piles"
   (c) McFee, Wm., "Electro-Foagulation in Surgery."
   (d) Wyeth, Geo., "Endothermy in Malignancy."
   (e) Elmer, R. F., "Electro-Coagulation of Tonsils."
   (f) Kelley, Howard, "Treatment of Tumors of Bladder"
   (g) Surgical Diathermy in Treatment of Benign Skin Blemishes
3. Stewart, H. E., Physiotherapy, Paul Hober and Sons, 1928
4. Walters, Walter, "Electrosurgical Methods for Aseptic Gastroenterostomy," New England Journal of Medicine, January, 1930.
5. Pamphlets:
   (a) Kelly, H. A., "The New Surgery," Engeln Physiotherapy Service Dep't. '25.
   (b) Kolischer, G., "Surgical Diathermy In Its Application to Malignant Tumors," Engeln P. T. Service Dep't., 1924.
   (c) "Diathermy: History, Use, Indications" Desjardins, A. U. and Kelley, Ann, (Mayo Clinic) Engeln, P. T. Service Dep't., 1924.
   (d) "Diathermy From the Nurse's Point of View."